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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Reissue Application of :

BILL L. DAVIS and JESSE S. WILLIAMSON

For Reissue of U.S. Patent 5,630,393

Issued May 20, 1997

Serial No. 08/515,097

Filing Date: May 20, 1999

Serial No: 09/315,796 *part of paper # 28*

For: COMBINED LITHOGRAPHIC/
FLEXOGRAPHIC PRINTING
APPARATUS AND PROCESS

(Group Art Unit:

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SUPPLEMENTAL DECLARATION OF RAYMOND J. PRINCE

I, Raymond J. Prince, under penalties of perjury declare and state the following:

1. I am the same Raymond J. Prince who made a declaration in May 1999 submitted with the original application for reissue, and reaffirm the statements made therein.

2. I have been asked to review once again U. S. Patent 5,630,363, specifically in reference to an office action in reissue application Serial No. 09/315,796, as well as European Patent Application EP 741 025 - A2 cited in that office action, and give my opinion as to its teachings to one of ordinary skill in the printing arts and respond to specific questions concerning (1) the teaching of the sentence of col. 1. line 54-55 : "Many sheetfed presses can perfect (print both sides of the paper) in one pass through the press." as that sentence impacts the scope of the invention taught to the printing artisan, and (2) the correct interpretation of the term "over" in the specification and claims. In addition I have been asked to explain the meaning of the statement "continuous in-line process" and the printing terms "perfecting", "perfector", "perfecting press", "overcoating", "on top of", and "overprinting". Finally, I have been asked to give my opinion concerning the adequacy of each of the '383 patent claims being reissued and the impact as to patentability of EP 741 025 - A2 concerning claims 1 - 87 sought to be reissued as originally filed. This document is intended to supplement my first Declaration of May 1999.

SUPPLEMENTAL DECLARATION OF RAYMOND J. PRINCE

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3. I have received a portion of an office action in the captioned application and understandings dated February 8, 2000 concerning a rejection of claims 44 - 87 under 35 U.S.C. section 251 as allegedly lacking support in the specification, attached hereto as Exhibit A. I have also reviewed reissue applicants originally filed reissue claims as filed 1-87, Exhibit B. **For the reasons that follow in paragraphs 4 -10 below, I disagree with the examiner's conclusions in Exhibit A, and conclude claims 1-87 are supported by the specification of the '363 patent being reissued.**

4. The terminology of the printing industry has gone through many changes in the past 500 years, it can get a bit complex to the lay person with words having many meanings depending on how they are used.

(A.) "Perfecting" means to print on both sides of the sheet or web in on pass through the press. Most web presses sold today and in the last 20 years are perfecting presses. These presses operate using a blanket to blanket cylinder approach. Therefore every time the word web is used in '363 patent it means a "perfecting process".

(B.) Press manufacturers will refer to a "perfecting press" by the number of colors, and where the perfecting unit is. A 6-color press with the perfecting unit between units 2 and 3 would be referred to as a "2 over 4 unit". It can print 2 colors and turn the sheet and print 4 more colors. One can purchase 1 over 5 presses as well as 2 over 2 presses and just about every combination one can think of.

(C.) Another way of expressing the above (B.) is to describe a 6- color press with a "perfecting" unit between units 2 and 3 would be to state is as a "2/4 press".

5. The term " single in-line continuous printing process" in the '363 patent also refers to a "perfecting press". A prime example is a web offset press, which prints on both sides of the web of paper, that begins with a roll of paper and ends with a folded signature of final product. It may also refer in a sheetfed plant to a perfecting press in which unprinted paper is fed into the press and a sheet printed on both sides is delivered. A press that cannot print on both sides in one pass is not a "single in-line continuous printing process".

6. Based on the above teachings of "perfector", together with the teachings of printing "over" and "single in-line continuous printing process", claims 44 -87 of the '363 reissue application are based on a perfecting press as described in '363, and are well supported by the teachings of the '363 patent.

7. The term "overcoating" can be used with a press that does "perfect" as well as with a press that does not "perfect". The term means to apply a material/coating over a previously applied material. Printing "on top of" is synonymous with "overprinting" -- printing on the same side of -- which is a subset of printing "over" in which the second or downstream unit can also print on the reverse side of the substrate.

8. In column 4 lines, 29 and 43 of the '363 patent, reference is made to printing an image "over" a previously printed image. In column 4 line 38 of the '363 patent overcoating can apply to a perfecting press or a non- perfecting press, the preferred method would be to accomplish this on one pass through the press (a in-line continuous printing process), a perfector. Generally when the term "overcoating" is used in the art, it is used to describe the use of a final coating of a gloss, dull or matt water based or UV coating to improve finish (visual) and or rub resistance.

9. In reviewing column 7, lines 52-60 of the '363 patent, the language "on top of" is only describing one way printing works, using reissue applicants process. This is the same on a "perfecting" or non-perfecting press.

10. In independent '363 claims 44,53,55,58,60,72,82 and 86 use the terminology "thin controlled layers". This terminology is merely referring to ink or coatings, i.e. images. One skilled in the art would know they are synonymous.

11. I have also been asked to review the process aspects of EP 741,025A2 ('025") in conjunction, and rejections, of claims 1 - 87 based on anticipation (35 U.S.C. sec 102) and obviousness (35 U.S.C. sec 103) by the examiner, in the same office action, the pertinent portion attached hereto as Exhibit C. I understand that the examiner believes the invention of reissue claims 1-6, 9-20, 22-25, and 28-38 are taught by the '025, i.e. "anticipated", and the remaining claims "obvious". I understand a publication is anticipatory if it puts one of average skill in the art in possession of the claimed invention at the time of (filing date) of the claimed invention. I understand that a referral make a claims invention obvious if the claimed invention as a whole was obvious to perform or to do as of the filing date of the claimed invention. **I strongly disagree with the examiner and I found claims 1 - 87 cannot be anticipated or made obvious by the '025 even if it is prior art (which I cannot see how, the '025 was published in late 1996 and the filing date of the '363 is in 1995).** In examining EP 0 741 025 A2, I conclude:

- (1.) There is no reference to "perfecting" in the '025;
- (2.) The '025 application refers to "overprinting" which is not "perfecting", and which is not synonymous with "printing over";

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- (3.) There is no mention of a "single in-line continuous printing process" in the '025;
- (4.) The '025 application expounds the cantilever approach and its design rather than a process-- the cantilever design has been in use throughout history, and I find it hard to believe that valid cantilevered apparatus claim's for the particular cantilever disclosed could be an issue in any industrial country;
- (5.) Cantilevered coaters, as described in the '025 and variations thereof, was traditionally placed at the end of a presses as of 1995, not between units;
- (6.) The '025 application would not even as of May 1995 adequately describe or enable one in the art to teach the '363 process. It does not adequately teach the '363 process, give a background as to the problems in the art, i.e. the problems with the WIMS patent listed below, nor does it provide the process. Further, benefits as does the '363 patent, it therefore, in my opinion, does not place the artisan in 1995 in possession of the '363 invention. Specifically, while column 2 lines 40-45 of the EP 0 741 025 A2 suggests that a flexographic unit could possibly be placed ahead of a lithographic unit, the application does not spell out any benefits -- there is no appreciation shown for doing flexography first--, in fact, the first part of col. 2 of EP 741 025 A2 specifically indicates that the cantilevered device can be put at the last unit, as it was done traditionally, or between units, which has a dramatically different effect. Absent (a) being taught the benefits of performing flexography first (see, e.g., col. 4, lines 10 - 20 and col. 6, line 37 - col. 8, line 27 in the Davis et al.'363), and the problems those benefits solved (see columns 3, and 4, lines 1-9 of the '363 and (b) knowing about the reissue applicants assignees prior "WIMS" patent U.S. 5,370,976 (incorporated by reference in the '363 patent at col.8, line 11), the artisan would not have had any motivation to try flexography prior to lithography in 1995 -- there is no reasonable expectation of reissue applicants' success. Moving a rack-back up front in the lithographic press in 1995 was an expensive undertaking. Moreover, in 1995 flexography was regulated generally to lower quality work in the industry and if combined with lithography it was placed at the end of the press to apply coatings and in rare instances metallic pigment in suspension in a waterbased coating. The flexography units in commercial use could not be physically placed between units due to size, without expensive modification. Further, the so-called "rack backs" available in 1994 or early 1995 for flexographic use were designed strictly for end of press installation. In addition there was

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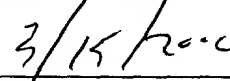
no technical reason indicated in the '025 application to place one or more flexo units between or ahead of lithographic units due to quality. The WIMS '976 patent is not mentioned, let alone incorporated by reference in the '025. Recently there has been great progress in the flexographic process and in particular the quality of plates and inks as well as coatings. Today flexography is capable of very high quality work. Many wine labels as well as high quality flexible packaging for example potato chip bags are now done by the flexographic process. This quality was not generally available in mid 1995; and

- (7.) About 90% of the '025 patent publication is devoted to the teaching of the design of the cantilevered device, not a process. The teaching of the process is inadequate. The remainder of the publication does not instruct unequivocally the artisan how to perform reissue applicants process or provide benefits. It throws out to the reader is an opportunity to try it, without reason or motivation. Absent a teaching of reissue applicants found benefits and an incorporation of WIMS U.S. Pat. 5,370,976, and interpretation of the '025 patent as teaching claims 1-6, 9-20, 22-25 or 28-38, it is an exercise in sheer hindsight -- it is reading the '025 patent not as one in the art would have read it on May 4, 1995 (the '025 priority date), but in 1997 or later with the '363 in front of the printer. The '025 does not teach the benefits of the '363 process -- bizarre in my opinion in 1995 unless someone knew about it. It does not mandate using flexography first -- a fatal shortcoming in view of the fact it does not mention, let alone incorporate WIMS U.S. Pat. 5,370,976. 90% of the '025 teaching is about a cantilevered apparatus, the type of which was already in the art. No mention is made of the use of halftones. There is inadequate teaching of the use of blanket cylinders. I disagree that the teaching of claims 11-20 or 22-25 or 28 exists in the '025 in hindsight, ignoring the shortcoming of lack of incorporation of WIMS '976 and the outstanding results in reissue applicants process. In my opinion claims 7-9, 11-28 and 39-87 are clearly not taught, even in hindsight. Most importantly because of the failure of the '025 applicants to teach the benefits of the '363 patent and because of the failure to incorporate by reference WIMS '976, one skilled in the printing art is not in possession of even broad claims 1-6, 10, or 29-38 as of May, 1995. Such a reading would be pure hindsight.

The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application of any reissue thereon.



Raymond J. Prince



Date

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Supplemental Prince Exhibit A

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Claims 42 - 87 rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

First, in each of independent claims 44, 53, 55, 58, 60, 72, 80 - 82, and 85 - 87 and dependent claims 42, 43, and 49 the recitations of printing on "both sides, opposite sides, or the reverse side" of the substrate is not supported by the original disclosure. Other than the brief mention of perfecter printing in column 2 lines 54 - 55 with respect to prior art sheet fed presses there is no other discussion of perfecter printing or printing on opposite, both, or the reverse side of the substrate in the original disclosure. Furthermore, the terms "over" and "on top of" are used interchangeably in the specification and in no instance is it implied that sometimes the

term "over" refers to perfector printing. Specifically, the meaning of the term "over" in context in column 4 lines 29 and 43 (applicant's declaration incorrectly refers to column 5) is no different than the context meaning of "over" in column 4 line 38 (again the declaration, incorrectly refers to column 5) and column 6 line 3. Applicant's apparent argument that the use of this term with "overcoating" in the latter two instances clearly implies on the same side of the substrate but the first two instances of "over" with reference to "color images" implies perfector printing is without merit and self serving. Note original claims 29 and 34 in the parent application and column 7 lines 52 - 60 which state that additional "colored ink images" are printed "on top of" the previously printed image, thus, referring to printing on the same side of the substrate which contradicts applicant's assertion. Additionally, the use of the term "over" does not have any connotation of perfector printing in the art without being first preceded by "turning" or "flipping" and only with specific reference to the substrate. Lastly, the Declaration of Raymond J. Prince provides no objective evidence that the term "over" can refer to perfector printing and none of the exhibits provided in this declaration use the term "over" with respect to perfector printing.

Second, in independent claims 44, 53, 55, 58, 60, 72, 82, and 86 the terminology of applying "thin, controlled layers" to the substrate has no support in the original disclosure and, furthermore, has no clear scope or meaning.

Claims 42 - 87 are rejected under 35 U.S.C. 251 as being based upon new matter added to the patent for which reissue is sought.

Supplemental Prince Exhibit B

Reissue of U. S. Patent No. 5,630,363

CLAIMS

Note: Bracketed material in the following claims has been deleted from U. S. Patent 5,630,363 as issued; underlined materials, including new claims 42-84 has been added.

1. Apparatus for a combined lithographic/flexographic printing process comprising:
 - a substrate;
 - a plurality of successive printing stations for printing color images on the substrate in a continuous in-line process;
 - one of said stations comprising a flexographic printing station for printing a liquid vehicle image on said substrate with a slurry containing an encapsulated essence using the flexographic process;
 - at least one of said successive printing stations being a lithographic printing station; and
 - an overcoating applied over the liquid vehicle image on the printed substrate at at least one of said successive lithographic printing stations using the lithographic process in said continuous in-line process.
2. Apparatus as in claim 1 wherein said overcoating is an aqueous overcoating.
3. Apparatus as in claim 1 wherein said overcoating is an ultraviolet ink overcoating.
4. Apparatus as in claim 1 wherein:
 - said substrate is a paper sheet; and

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said apparatus includes a sheet feeder.

5. Apparatus as in claim 1 wherein:

said substrate is a web; and

said apparatus includes a web feeder.

6. Apparatus for a combined lithographic/flexographic printing process comprising:

a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process;

one of said stations comprising a flexographic printing station printing an aqueous-based vehicle image using the flexographic process to form a metallic coating;

a suspended metallic material being included in said aqueous-based vehicle image; and

at least one of the successive printing stations comprising an offset lithographic printing station printing a color image over the aqueous-based vehicle image using the offset lithographic process in said continuous in-line process.

7. Apparatus as in claim 6 wherein said suspended material includes uniform-sized metal particles to form said metallic coating.

8. Apparatus as in claim 6 wherein said suspended material includes nonuniform-sized metal particles to form said metallic coating.

9. Apparatus as in claim 6 further including: said flexographic printing station including a plate cylinder having a flexographic plate thereon, a blanket cylinder, and an impression cylinder;

a flexographic plate image transferred from said plate cylinder to said blanket cylinder, said image being formed of said metallic coating, said blanket cylinder transferring said metallic coating to said impression

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cylinder for printing said flexographic plate image on said substrate; and

an anilox roller associated with said flexographic plate for supplying said aqueous-based vehicle containing said suspended metallic material to said flexographic plate.

10. Apparatus for creating a combined lithographic/flexographic printing process comprising:

a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process;

one of said stations comprising a flexographic printing station for printing a first color image using the flexographic process; and

at least one of the successive printing stations comprising an offset lithographic printing station for printing a second color image over the first color image using the offset lithographic process in said continuous in-line process.

11. Apparatus as in claim 10 further including:

said flexographic printing station including a plate cylinder, a blanket cylinder, and an impression cylinder;

a flexographic plate on said plate cylinder;

an anilox roller associated with said flexographic plate for supplying a first color to said flexographic plate to form said first color image; and

said blanket cylinder receiving said first color image from said plate cylinder and transferring said first color image to said impression cylinder for printing on said substrate.

12. Apparatus for creating a combined lithographic/flexographic printing process comprising:

a substrate;

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a plurality of successive printing stations for printing color images on the substrate in a continuous in-line process;

at least two successive ones of said printing stations being flexography stations and comprising:

- (1) a supply of liquid coating;
- (2) a plate cylinder associated with a blanket cylinder, said plate cylinder having a flexographic plate thereon;
- (3) an anilox roller associated with said liquid supply coating and said plate cylinder for delivering said liquid coating to said flexographic plate to form an image for transfer to said blanket cylinder;
- (4) an impression cylinder for receiving said liquid coating image transferred from said blanket cylinder and printing said image on said substrate, said at least two flexography stations printing the same liquid coating image in sequence and in superimposed relationship; and

at least one offset lithographic printing station for receiving said substrate and printing over said liquid coating image.

13. Apparatus as in claim 12 wherein said liquid coating image printed on said substrate is a white color ink.

14. Apparatus as in claim 12 further including an air dryer associated with each of said impression cylinders on said flexography stations, said air dryer having sufficient air velocity for drying said liquid coating before the substrate is transferred to the successive printing station in said continuous in-line process.

15. Apparatus for a combined lithographic/flexographic printing process comprising:

a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process, said printing stations including both lithographic and flexographic printing stations;

a blanket cylinder at at least a first one of said flexographic printing stations;

flexographic ink-providing means at said at least first one of said flexographic printing stations for applying a flexographic ink to said blanket cylinder to form an image;

a substrate for receiving said flexographic ink image transferred from said blanket cylinder; and

at least one subsequent lithographic printing station in said in-line process for receiving said image printed substrate and printing an additional colored ink image on said substrate on top of said flexographic ink image using offset lithography.

16. Apparatus as in claim 15 further comprising:

a plate cylinder at said at least first one of said flexographic stations;

a flexographic plate on said plate cylinder for receiving and transferring said flexographic ink to said blanket cylinder; and

said flexographic ink-providing means including a flexographic ink supply and an anilox roller associated with said flexographic ink supply for transferring said flexographic ink to said flexographic plate.

17. Apparatus for a combined lithographic/flexographic printing process for printing a multicolored image comprising:

a plurality of successive printing stations for printing color on a substrate in a continuous in-line process, said printing stations including both lithographic and flexographic printing stations;

at least one of said flexographic printing stations having:

(1) a plate cylinder and a blanket cylinder, said plate cylinder including a flexographic plate having an

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image thereon for transferring a flexographic color ink image to said blanket cylinder;

(2) an etched anilox roller for applying a flexographic color ink to said flexographic plate on said plate cylinder;

(3) an impression cylinder in ink-transfer relationship with said blanket cylinder for transferring said flexographic color ink image from said blanket cylinder to said substrate; and

at least one of said succeeding printing stations being a lithographic printing station using offset lithography for printing additional colored ink images on top of said flexographic ink image.

18. Apparatus as in claim 17 wherein said additional colored ink images are formed with lithographic inks.

19. Apparatus as in claim 17 wherein said colored ink images are formed with waterless inks.

20. Apparatus as in claim 17 further including an air dryer adjacent to said impression cylinder for drying the flexographic ink image transferred to said substrate before said additional colored ink images are printed thereon.

21. Apparatus as in claim 17 further including halftone printing plates for printing said colored ink images.

22. Apparatus as in claim 17 wherein said flexographic ink image and said colored ink images are printed as solid colors and/or with halftone printing plates in sequence and in registry in said successive printing stations to produce said multicolored image on said substrate.

23. Apparatus as in claim 17 wherein said printing apparatus includes a sheet-fed press.

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24. Apparatus as in claim 17 wherein at least one of said flexographic printing stations prints said flexographic ink image with liquid vehicle slurry containing an encapsulated essence.

25. Apparatus as in claim 17 wherein at least one of said printing stations prints said flexographic ink image with a water-based liquid vehicle containing suspended particles.

26. Apparatus as in claim 25 wherein said suspended particles are uniform in size.

27. Apparatus as in claim 25 wherein said suspended particles are nonuniform in size.

28. Apparatus as in claim 25 wherein said suspended particles are metallic particles.

29. A method of combining lithography and flexographic printing in a continuous in-line process comprising the steps of:

providing a plurality of successive lithographic/flexographic printing stations for printing colored ink images on a substrate;

printing a flexographic ink image on said substrate at at least one of said flexographic stations;

transferring said printed substrate to at least one subsequent printing station in said continuous in-line process; and

printing colored ink images [on top of] over said flexographic ink image at at least one of said subsequent lithographic printing stations with an offset lithographic process.

30. A method as in claim 29 further comprising the step of drying said flexographic ink image on said substrate with an air dryer prior to printing said colored ink images thereon.

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31. A method as in claim 29 further including the step of printing a coating on top of said colored ink images at one of said plurality of subsequent printing stations.

32. A method as in claim 29 wherein said colored inks forming said colored ink images are waterless.

33. A method as in claim 29 wherein said colored inks forming said colored ink images are in a solvent-based liquid vehicle.

34. A method as in claim 29 further including the steps of:

printing a slurry on said substrate at any of said printing stations in said continuous in-line process;

using an encapsulated essence in said slurry; and

printing an overcoating [over] on top of said slurry at a subsequent printing station in said in-line process to protect said essence.

35. A method as in claim 34 further including the step of printing an aqueous-based coating over said slurry.

36. A method as in claim 34 further including the step of printing an ultraviolet coating over said slurry.

37. A method of combining offset lithography and flexographic printing in a continuous in-line process comprising the steps of:

providing a substrate;

applying a flexographic ink to a blanket cylinder in a pattern with a coating head at a first flexographic printing station;

transferring said pattern of flexographic ink from said blanket cylinder to the substrate; and

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printing a waterless ink pattern over said flexographic ink pattern on said substrate at at least one subsequent offset lithographic printing station in said continuous in-line process.

38. A method of combining lithography and flexographic printing in a continuous in-line process comprising the steps of:

printing an aqueous-based vehicle image having suspended particles therein on a substrate at a first flexographic printing station;

transferring said image printed substrate to at least one additional printing station in said continuous in-line process; and

printing additional colored ink images on said printed substrate over said aqueous-based vehicle image in an offset lithographic process at said at least one additional printing station in said in-line process.

39. A method of combining lithography and flexographic printing in a continuous in-line process comprising the steps of:

(1) providing a plurality of successive printing stations for printing liquid vehicle images on a substrate in said in-line continuous process;

(2) utilizing an anilox roller to transfer a liquid ink as said liquid vehicle to a flexographic plate image at at least one of said printing stations;

(3) printing said liquid ink from said flexographic plate image to a substrate;

(4) transferring said printed substrate with said liquid ink image to a subsequent printing station in said in-line printing process;

(5) repeating steps (2)-(4) at subsequent printing stations in said in-line process to achieve a desired opacity ink image on said substrate; and

(6) printing an ink pattern over said flexographic ink image using an offset lithographic process.

40. A method as in claim 39 further including the step of additionally printing colored ink images over said liquid ink image on said substrate at subsequent ones of said printing stations in said in-line process.

41. A method as in claim 40 wherein said liquid ink is an opaque white color.

42. The apparatus of any of claims 1, 6, 10, 12, 15 and 17, wherein the substrate is printed on both sides in one pass during the continuous in-line process.

43. The method of any of claims 29, 37, 38 or 39 wherein the substrate is printed on both sides in one pass during the continuous in-line process.

44. Apparatus for a combined lithographic/flexographic printing process comprising:

a substrate;

a plurality of successive printing stations for depositing a series of thin, controlled layers on one side of a substrate in a continuous in-line process;

one of said stations comprising a flexographic printing station for printing a liquid vehicle image on said substrate using a flexographic process; and

at least one of said successive printing stations being a lithographic printing station;

whereby said substrate is printed on top of or on the opposite side of that previously printed at at least one of said successive lithographic printing stations using the lithographic process in said continuous in-line process.

45. Apparatus as in claim 44 wherein at least one of said thin, controlled layers at the flexographic station is a coating material.

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46. Apparatus as in claim 44 wherein at least one of said thin, controlled layers at one of the lithographic stations is an ink.

47. Apparatus as in claim 44 wherein:

said substrate is a paper sheet; and

said apparatus includes a sheet feeder.

48. Apparatus as in claim 44 wherein:

said substrate is a web; and

said apparatus includes a web feeder.

49. The apparatus of claim 44 for a combined lithographic/flexographic printing process comprising:

a plurality of successive printing stations for depositing a series of thin, controlled layers on a substrate in a continuous in-line process;

one of said stations comprising a flexographic printing station printing an aqueous-based vehicle on one side of the substrate using the flexographic process to form a metallic coating image;

a suspended metallic material being included in said aqueous-based vehicle; and

at least one of the successive printing stations comprising an offset lithographic printing station printing a color image on top of the aqueous-based vehicle or on the opposite side to that previously printed using the offset lithographic process in said continuous in-line process.

50. Apparatus as in claim 49 wherein said suspended material includes uniform-sized metal particles to form said metallic coating.

51. Apparatus as in claim 49 wherein said suspended material includes nonuniform-sized metal particles to form said metallic coating.

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52. Apparatus as in claim 49 further including:
said flexographic printing station including a plate cylinder
having a flexographic plate thereon, a blanket cylinder, and
an impression cylinder;

a flexographic plate image transferred from said
plate cylinder to said blanket cylinder, said image being
formed of said metallic coating, said blanket cylinder
transferring said metallic coating to said impression
cylinder for printing said flexographic plate image on said
substrate; and

an anilox roller associated with said flexographic
plate for supplying said aqueous-based vehicle containing
said suspended metallic material to said flexographic plate.

53. Apparatus for creating a combined
lithographic/flexographic printing process comprising:

a plurality of successive printing stations for
depositing a series of thin, controlled layers on a substrate
in a continuous in-line process;

one of said stations comprising a flexographic
printing station for printing a first color image using the
flexographic process; and

at least one of the other successive printing stations
comprising an offset lithographic printing station for
printing a second color image on the reverse side of the
substrate of the first color image using the offset
lithographic process in said continuous in-line process.

54. Apparatus as in claim 53 further including:

said flexographic printing station including a plate
cylinder, a blanket cylinder, and an impression cylinder;

a flexographic plate on said plate cylinder;

an anilox roller associated with said flexographic
plate for supplying a first color to said flexographic plate to
form said first color image; and

said blanket cylinder receiving said first color image from said plate cylinder and transferring said first color image to said impression cylinder for printing on said substrate.

55. Apparatus for creating a combined lithographic/flexographic printing process comprising:

a substrate;

a plurality of successive printing stations for depositing a series of thin, controlled layers on a substrate in a continuous in-line process;

at least one of said printing stations being flexographic stations and comprising:

(1) a supply of liquid coating;

(2) a plate cylinder associated with a blanket cylinder, said plate cylinder having a flexographic plate thereon;

(3) an anilox roller associated with said liquid supply coating and said plate cylinder for delivering said liquid coating to said flexographic plate to form an image for transfer to said blanket cylinder;

(4) an impression cylinder for receiving said liquid coating image transferred from said blanket cylinder and printing said image on one side of said substrate; and

at least one offset lithographic printing station for receiving said substrate and printing on top of or on the opposite side to that previously printed.

56. Apparatus as in claim 55 wherein said liquid coating image printed on said substrate is a white color ink.

57. Apparatus as in claim 56 further including an air dryer associated with each of said impression cylinders on said flexography stations, said air dryer having sufficient air velocity for drying said liquid coating before the substrate is transferred to the successive printing station in said continuous in-line process.

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58. Apparatus for a combined lithographic/ flexographic printing process comprising:

a plurality of successive printing stations for depositing a series of thin, controlled layers on a substrate in a continuous in-line process, said printing stations including both lithographic and at least two flexographic printing stations;

a blanket cylinder at at least a first one of said flexographic printing stations;

flexographic ink-providing means at the other of said flexographic printing stations for applying a flexographic ink to said blanket cylinder to form an image on one side of a substrate;

a substrate for receiving said flexographic ink image transferred from said blanket cylinder; and

at least one subsequent lithographic printing station in said in-line process for receiving said image printed substrate and printing an additional colored ink image on said substrate on top of said flexographic ink image or the opposite side to that previously printed using offset lithography.

59. Apparatus as in claim 58 further comprising:

a plate cylinder at said at least first one of said flexographic stations;

a flexographic plate on said plate cylinder for receiving and transferring said flexographic ink to said blanket cylinder; and

said flexographic ink-providing means including a flexographic ink supply and an anilox roller associated with said flexographic ink supply for transferring said flexographic ink to said flexographic plate.

60. Apparatus for a combined lithographic/ flexographic printing process for printing a multicolored image comprising:

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a plurality of successive printing stations for depositing a series of thin, controlled layers on a substrate in a continuous in-line process, said printing stations including both lithographic and flexographic printing stations;

at least one of said flexographic printing stations having:

(1) a plate cylinder and a blanket cylinder, said plate cylinder including a flexographic plate having an image thereon for transferring a flexographic color ink image to said blanket cylinder;

(2) an etched anilox roller for applying a flexographic color ink to said flexographic plate on said plate cylinder;

(3) an impression cylinder in ink-transfer relationship with said blanket cylinder for transferring said flexographic color ink image from said blanket cylinder to one side of said substrate; and

at least one of said succeeding printing stations being a lithographic printing station using offset lithography for printing additional colored ink images on top of said flexographic ink image or on the opposite side to that that previously printed.

61. Apparatus as in claim 60 wherein said additional colored ink images are formed with lithographic inks.

62. Apparatus as in claim 60 wherein said colored ink images are formed with waterless inks.

63. Apparatus as in claim 60 further including an air dryer adjacent to said impression cylinder for drying the flexographic ink image transferred to said substrate before said additional colored ink images are printed thereon.

64. Apparatus as in claim 60 further including halftone printing plates for printing said colored ink images.

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65. Apparatus as in claim 60 wherein said flexographic ink image and said colored ink images are printed as solid colors and/or with halftone printing plates in sequence and in registry in said successive printing stations to produce said multicolored image on said substrate.

66. Apparatus as in claim 60 wherein said printing apparatus includes a sheet-fed press.

67. Apparatus as in claim 60 wherein at least one of said flexographic printing stations prints said flexographic ink image with liquid vehicle slurry containing an encapsulated essence.

68. Apparatus as in claim 60 wherein at least one of said printing stations prints said flexographic ink image with a water-based liquid vehicle containing suspended particles.

69. Apparatus as in claim 68 wherein said suspended particles are uniform in size.

70. Apparatus as in claim 68 wherein said suspended particles are nonuniform in size.

71. Apparatus as in claim 68 wherein said suspended particles are metallic particles.

72. A method of combining lithography and flexographic printing in a continuous in-line process comprising the steps of:

providing a plurality of successive lithographic/flexographic printing stations for depositing a series of thin, controlled layers on a substrate;

printing an image as one of said thin controlled layers on one side of said substrate at at least one of said flexographic stations;

transferring said printed substrate to at least one subsequent printing station in said continuous in-line process; and

printing an image on the reverse side of said substrate having said flexographic ink image, at at least one of said other subsequent lithographic printing stations with an offset lithographic process in the continuous in-line process.

73. A method as in claim 72 further comprising the step of drying said flexographic ink image on said substrate with an air dryer prior to printing said colored ink images thereon.

74. A method as in claim 72 further including the step of printing a coating on top of said colored ink images at one of said plurality of subsequent printing stations.

75. A method as in claim 72 wherein said colored inks forming said colored ink images are waterless.

76. A method as in claim 72 wherein said colored inks forming said colored ink images are in a solvent-based liquid vehicle.

77. A method as in claim 72 further including the steps of:

printing a slurry on one side of said substrate at any of said printing stations in said continuous in-line process;

using an encapsulated essence in said slurry; and

printing an ink on the reverse side of said substrate at a subsequent printing station in said in-line process.

78. A method as in claim 77 further including the step of printing an aqueous-based coating over said slurry.

79. A method as in claim 77 further including the step of printing an ultraviolet coating over said slurry.

80. A method of combining offset lithography and flexographic printing in a continuous in-line process comprising the steps of:

providing a substrate;

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applying an ink or coating to a blanket cylinder in a pattern with a coating head at a flexographic printing station;

transferring said pattern of ink or coating from said blanket cylinder to one side of the substrate; and

printing a waterless ink pattern on the reverse side of said substrate at at least one subsequent offset lithographic printing station in said continuous in-line process.

81. A method of combining lithography and flexographic printing in a continuous in-line process comprising the steps of:

printing an aqueous-based vehicle having suspended particles therein on one side of a substrate at a flexographic printing station to form an image;

transferring said image printed substrate to at least one additional printing station in said continuous in-line process; and

printing additional images on the reverse side of said printed substrate in an offset lithographic process at said at least one additional printing station in said in-line process.

82. A method of combining lithography and flexographic printing in a continuous in-line process comprising the steps of:

(1) providing a plurality of successive printing stations for depositing a series of thin, controlled layers on a substrate in said in-line continuous process;

(2) utilizing an anilox roller to transfer a liquid ink as one of said thin controlled layers to a flexographic plate image at at least one of said printing stations;

(3) printing said liquid ink from said flexographic plate image to one side of a substrate;

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(4) transferring said printed substrate with said liquid ink image to a subsequent printing station in said in-line printing process;

(5) repeating steps (2)-(4) at subsequent printing stations in said in-line process to achieve a desired opacity ink image on the one side of said substrate; and

(6) printing an ink pattern on the reverse side of said substrate using an offset lithographic process.

83. A method as in claim 82 further including the step of additionally printing ink images over said liquid ink image on said substrate at subsequent ones of said printing stations in said in-line process.

84. A method as in claim 83 wherein said liquid ink is an opaque white color.

85. A method of combining offset lithography and flexography using a plurality of successive printing stations in a continuous in-line process comprising:

(1) printing an image at one or more of said printing stations on a substrate using an offset lithographic process;

(2) transferring said image printed substrate to an additional printing station and printing at said additional printing station a coating on all or part of said image on said substrate;

(3) transferring said substrate to one or more additional printing stations for printing the reverse side of the said substrate; and

(4) printing an image on said reverse side of said substrate at one of such one or more printing stations using an offset lithographic process in the continuous in-line process.

86. Apparatus for a combined offset lithographic and flexographic printing process comprising:

(1) a substrate;

(2) a plurality of successive printing stations for depositing a series of thin layers of materials selected from a group consisting of lithographic and flexographic inks, coatings and slurries on one or both sides of a substrate in a continuous in-line process;

(3) at least one of said stations comprising a flexographic printing station for printing one of said flexographic materials on said substrate using a flexographic process;

(4) at least one of said successive printing stations being an offset lithographic printing station whereby said offset lithographic printing station is used to deposit one of said lithographic materials on either side of the said substrate in the continuous in-line process;

87. Apparatus for a combined offset lithographic/flexographic printing process comprising:

a plurality of successive printing stations for printing images on a substrate in a continuous in-line process, said printing stations including both offset lithographic and flexographic printing stations for depositing lithographic and flexographic inks, coatings and slurries on said substrate, whereby said lithographic and flexographic inks, coatings or slurries may be printed successively on one or both sides of said substrate in the continuous in-line process.

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Supplemental Prince Exhibit C

Serial No. 09/315,796
Art Unit 2854

-6-

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The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form

the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 - 6, 9 - 20, 22 - 25, and 28 - 38 are rejected under 35 U.S.C. 102(e) as being anticipated by DeMoore et al. (US 5,960,713). DeMoore et al. is ultimately a CIP of S.N. 08/435,798 which has a filing date of 5/4/95. While this patent is a CIP of the earlier application, and could contain subject matter not disclosed in that application, reference can presently be made to EP 741,025 which claims direct priority from S.N. 08/435,798. All references to Demoore et al. will be made to EP 741,025.

DeMoore et al. teach a first flexographic station (22, 110) for printing either colored inks, white ink, metallic particles, an encapsulated essence, or aqueous or UV coatings on a sheet or web (col. 2 lines 40-45, col. 3 lines 17-21, col. 4 lines 32-35, col. 9 line 47 - col. 10 line 18) and at least one successive lithographic station (24-28) for printing colored inks, aqueous, or UV coatings (col. 4 lines 32-50 and col. 10 lines 19-27). Applicant should carefully

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review the entire document of DeMoore et al. With respect to the flexographic plate, plate cylinder, blanket cylinder, and anilox roller see column 10 lines 4 - 11. With respect to successive flexographic stations see column 6 lines 21 - 27. With respect to the air dryer see column 9 lines 1 - 10. With respect to the waterless inks see column 3 lines 21 - 30 and column 10 lines 19 - 27. With respect to claim 22 the plates would inherently be either solid or halftone.

CLAIMS 7, 8, 21, 26, 27, AND 39 - 87 ARE REJECTED UNDER 35 U.S.C. 103(a) AS BEING UNPATENTABLE OVER DeMoore et al. With respect to the size of the metallic particles it would have been obvious to one of ordinary skill in the art to use uniform sized particles to achieve a uniform, flat printed image or non-uniform sized particles to achieve a desired textured appearance. With respect to claim 21 it is widely conventional in the art to make halftone lithographic printing plates to achieve superior image appearance. With respect to claim 39 it would have been obvious to one of ordinary skill in the art to overprint the same image with the same color ink to simply achieve a denser or more opaque color. With respect to the added claims, insofar as they are adequately supported by the original disclosure, DeMoore et al. teach in column 3 lines 17 - 19 that the substrate may be printed on either side. It would have been obvious to one of ordinary skill in the art to selectively print on both sides of the substrate so as to achieve desirable perfect printing.



US005960713A

United States Patent [19]

DeMoore et al.

[11] **Patent Number:** 5,960,713[45] **Date of Patent:** Oct. 5, 1999

[54] **RETRACTABLE PRINTING-COATING UNIT OPERABLE ON THE PLATE AND BLANKET CYLINDERS SIMULTANEOUSLY FROM THE DAMPENER SIDE OF THE FIRST PRINTING UNIT OR ANY CONSECUTIVE PRINTING UNIT OR ANY ROTARY OFFSET PRINTING PRESS**

[75] Inventors: **Howard W. DeMoore**, 10954 Shady Trail, Dallas, Tex. 75220; **Ronald M. Rendlemann**, Dallas, Tex.; **John W. Bird**, Carrollton, Tex.

[73] Assignee: **Howard W. DeMoore**, Dallas, Tex.

[21] Appl. No.: 09/136,901

[22] Filed: Aug. 19, 1998

Related U.S. Application Data

[63] Continuation-in-part of application No. 08/538,422, Oct. 2, 1995, abandoned, which is a continuation-in-part of application No. 08/435,798, May 4, 1995.

[51] Int. Cl.⁶ B41F 7/06; B41F 5/02; B41F 5/22

[52] U.S. Cl. 101/136, 137, 101/177

[58] Field of Search 101/136, 137, 101/142, 143, 144, 145, 177, 183, 207-210, 216, 217, 218, 349.1, 350.1, 350.2, 351.3, 352.01, 352.02, 352.04, 352.05, 363

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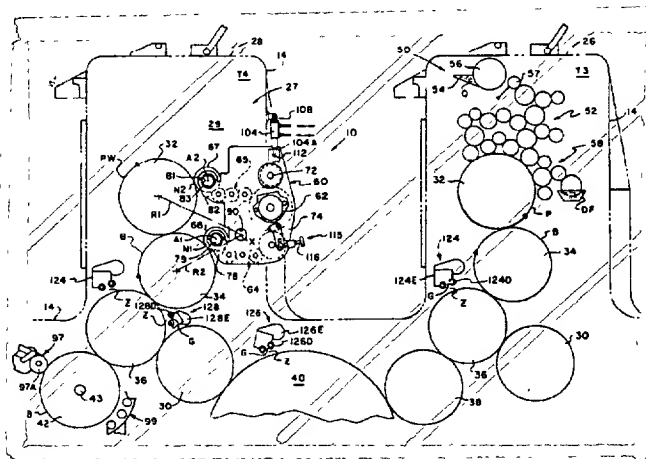
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Primary Examiner—J. Reed Fisher**Attorney, Agent, or Firm**—Locke Liddell & Sapp LLP

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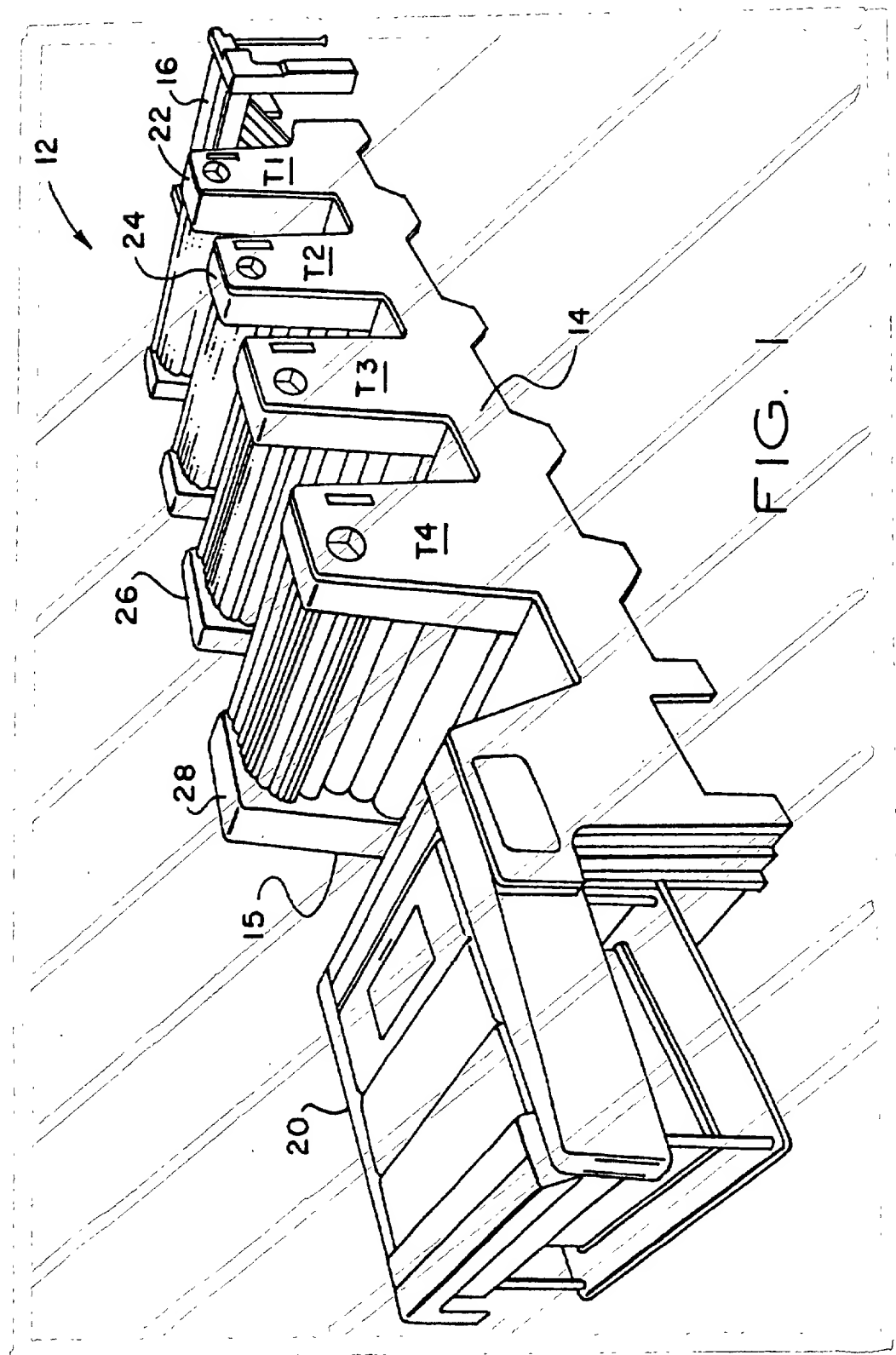
ABSTRACT

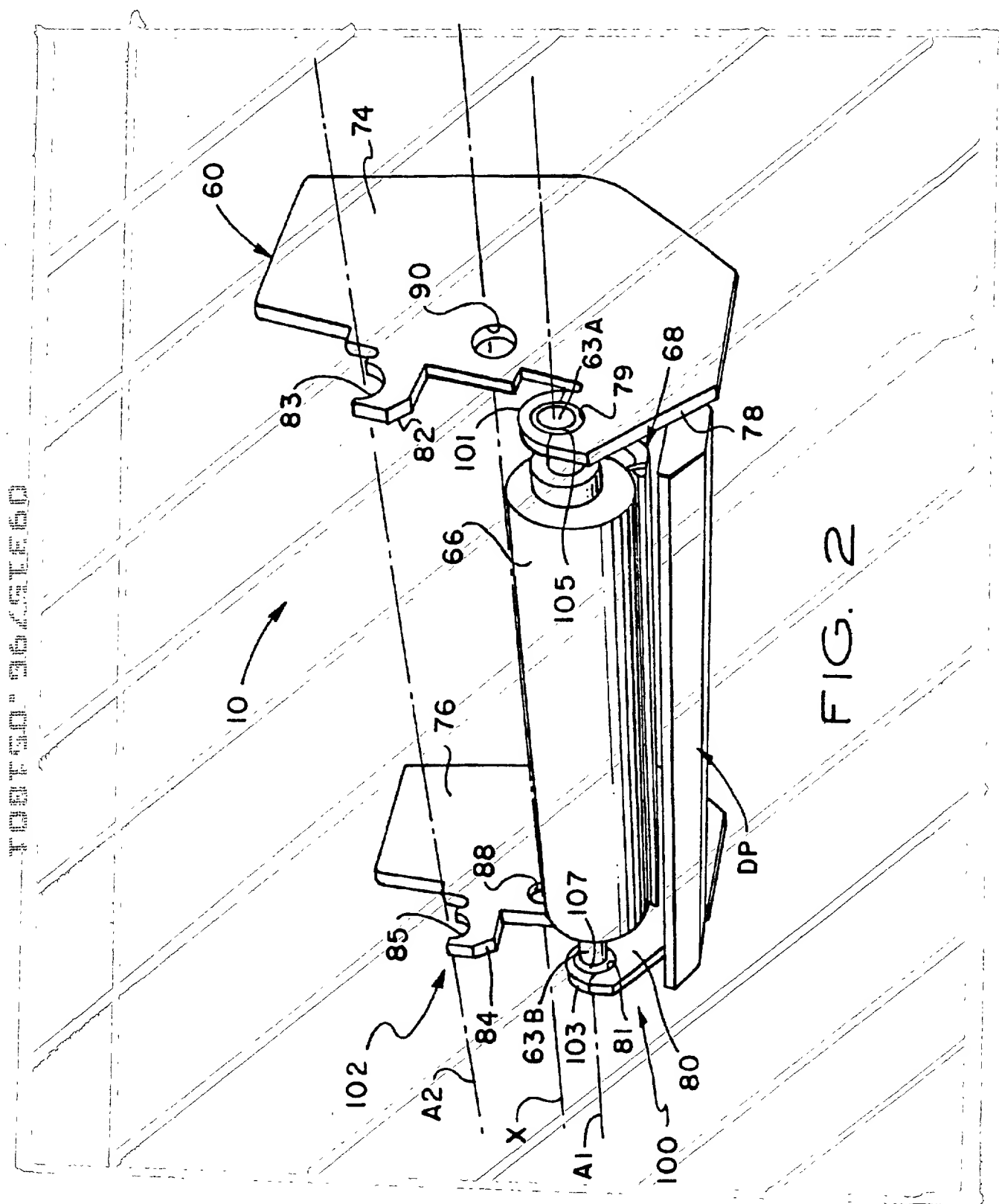
A retractable in-line inking/coating apparatus can apply either spot or overall inking/coating material to a plate and/or a blanket on the first printing unit or on any consecutive printing unit of any rotary offset printing press. The inking/coating apparatus is pivotally mounted within the conventional dampener space of any lithographic printing unit. The aqueous component of the flexographic printing ink or aqueous coating material is evaporated and dried by high velocity, hot air dryers and high performance heat and moisture extractors so that the aqueous or flexographic ink or coating material on a freshly printed or coated sheet is dry and can be dry-trapped on the next printing unit. The inking/coating apparatus includes dual cradles that support first and second applicator rollers so that the inking/coating apparatus can apply a double bump of aqueous/flexographic or UV-curable printing ink or coating material to a plate on the plate cylinder, while simultaneously applying aqueous, flexographic or UV-curable printing ink or coating material to a plate or a blanket on the blanket cylinder, and thereafter onto a sheet as the sheet is transferred through the nip between the blanket cylinder and the impression cylinder. A triple bump is printed or coated on the last printing unit with the aid of an impression cylinder inking/coating unit.

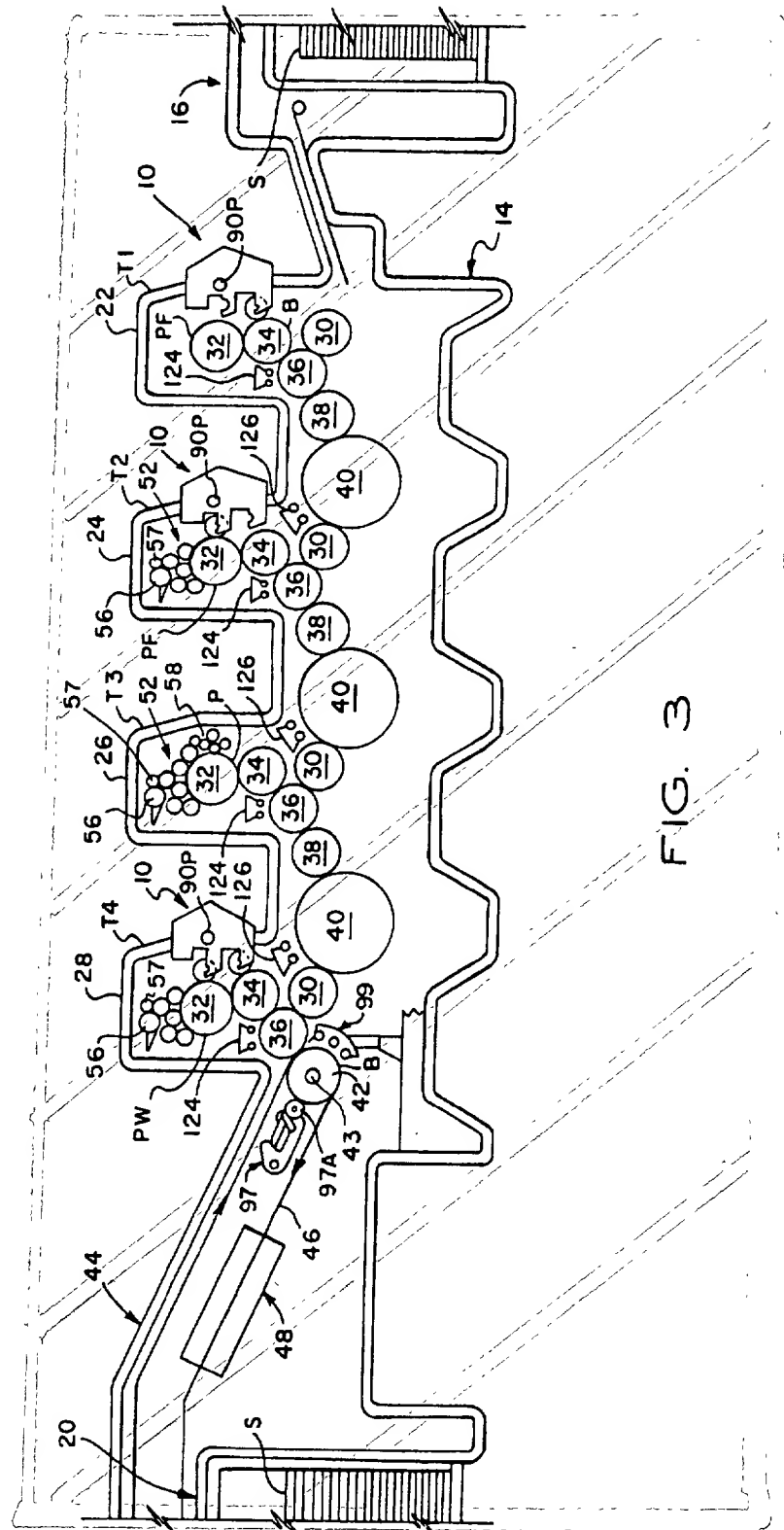
26 Claims, 15 Drawing Sheets

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4,934,305	6/1990	Koehler et al. .	
5,107,790	4/1992	Silker et al. .	
5,115,741	5/1992	Rodi	101/416.1 X
5,176,077	1/1993	DeMoore et al. .	
5,178,678	1/1993	Koehler et al.	118/46
5,209,179	5/1993	Herbert et al. .	
5,280,750	1/1994	Yoshida et al.	101/363

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FIG. 4

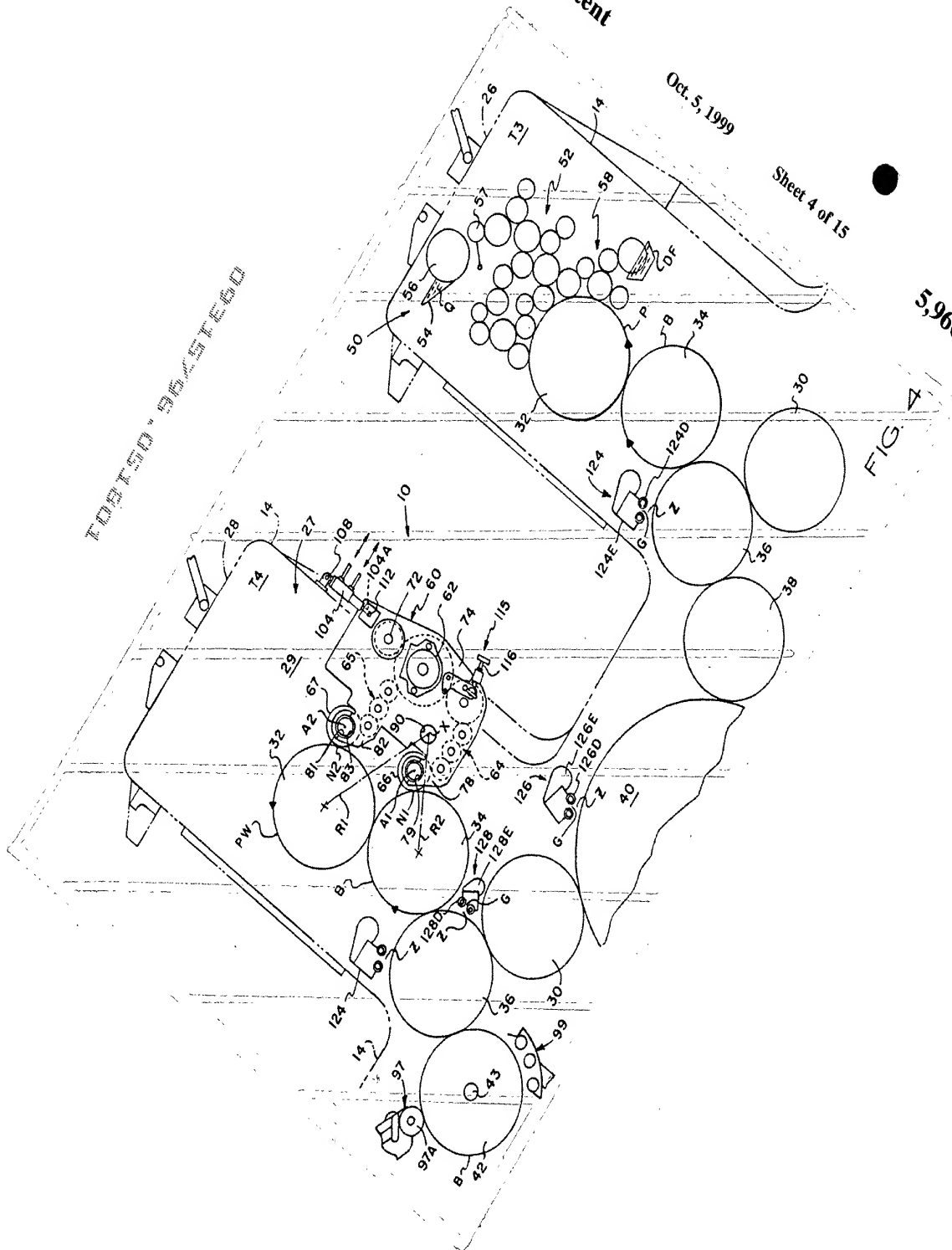


FIG. 5

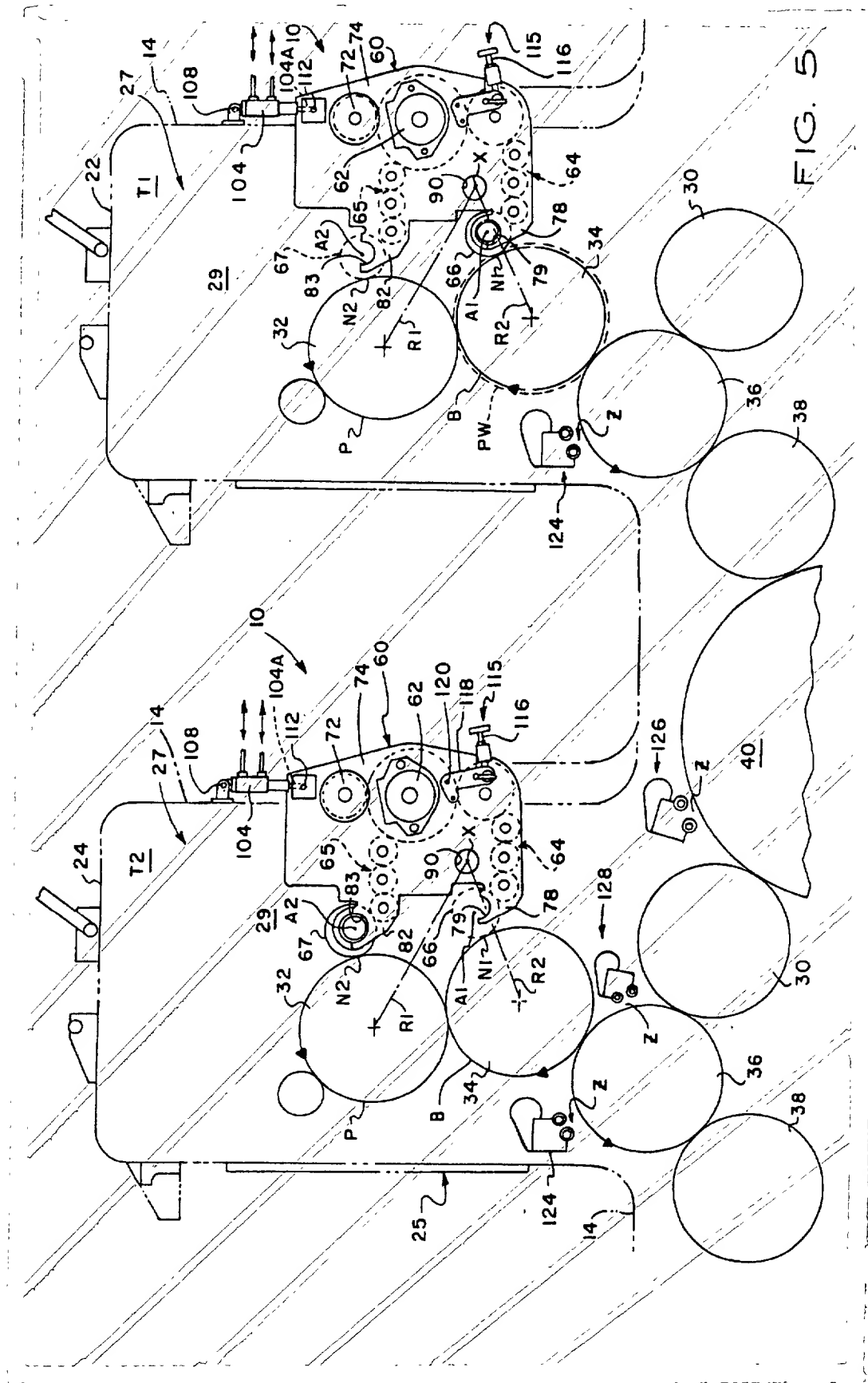


FIG. 6

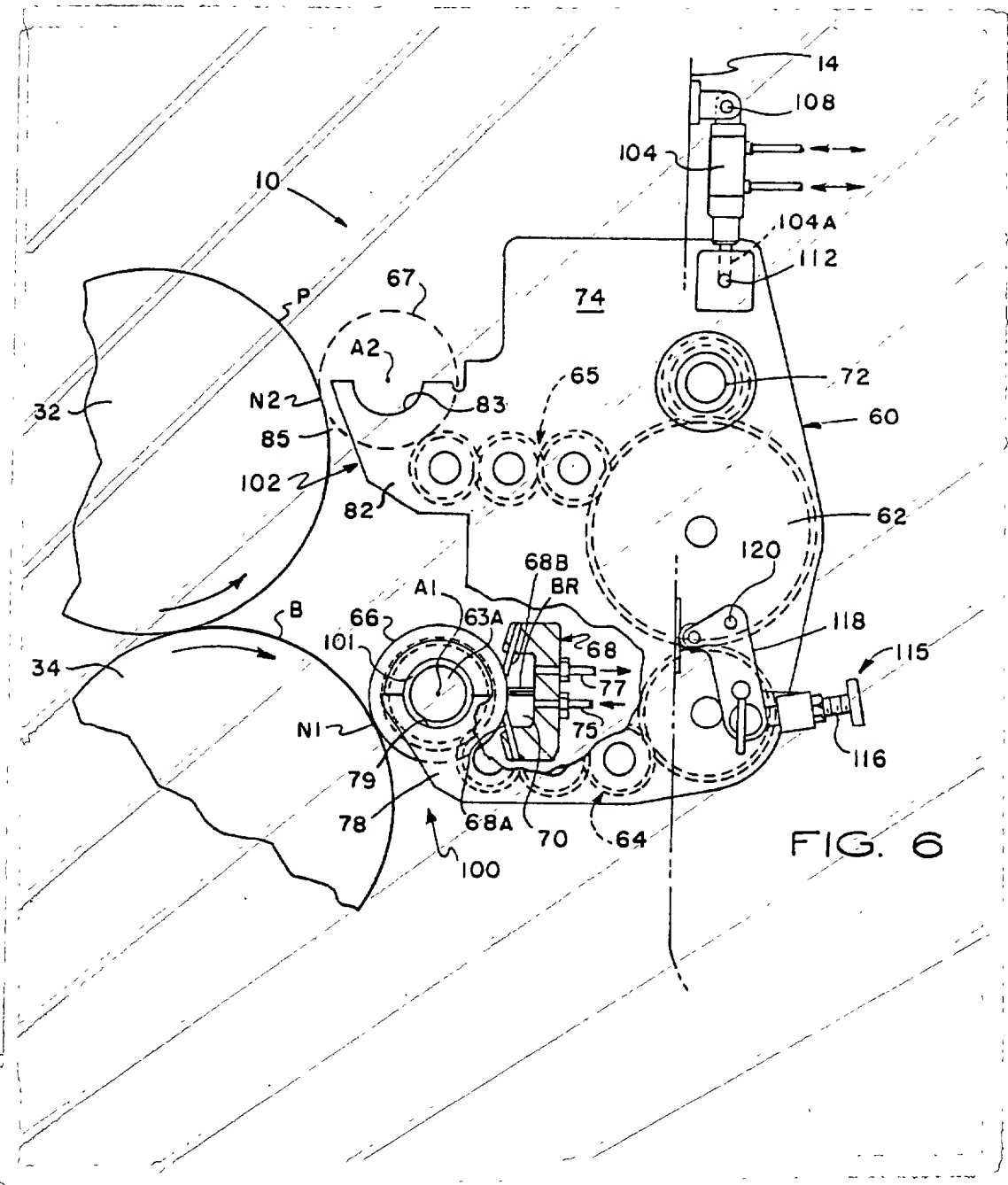
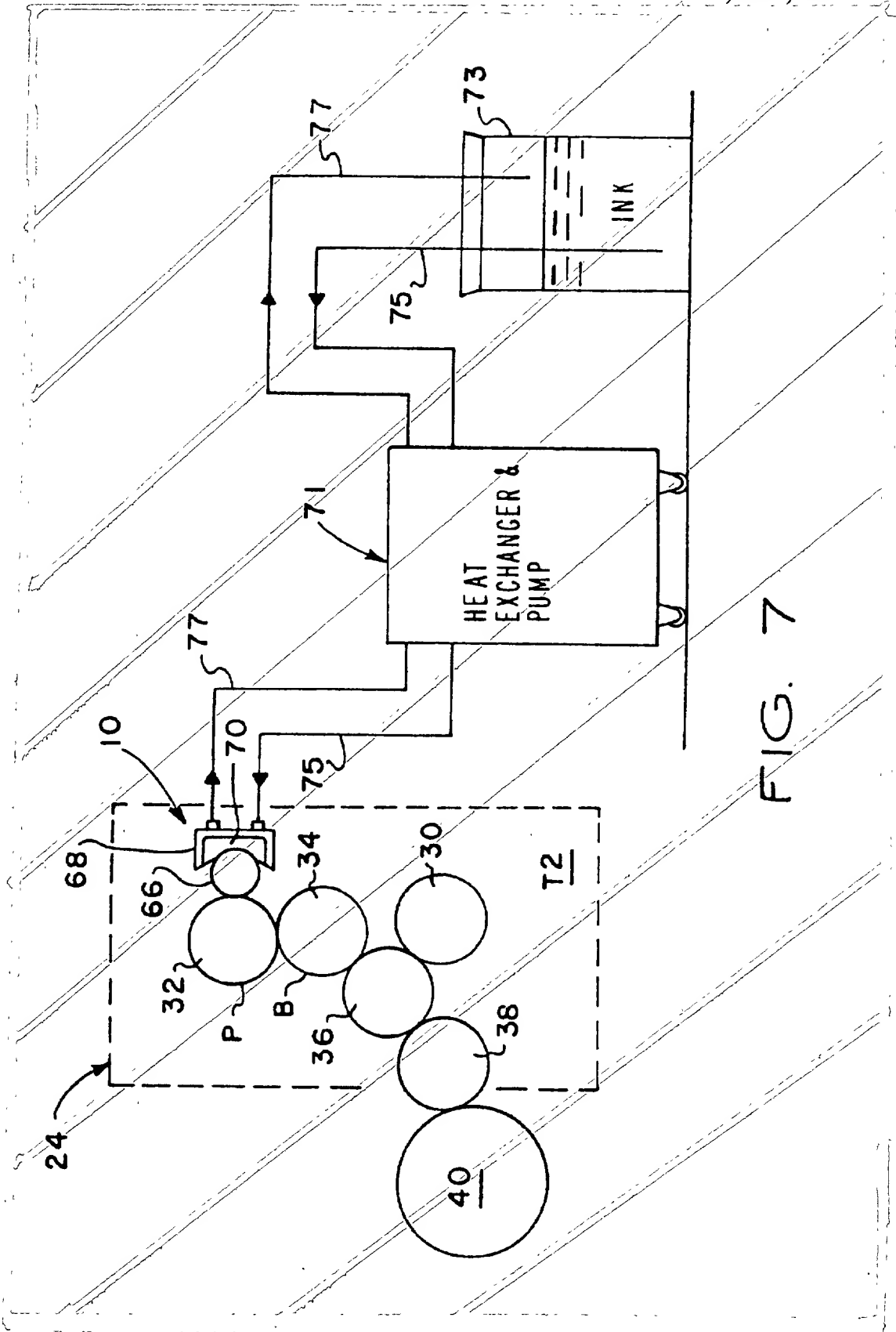
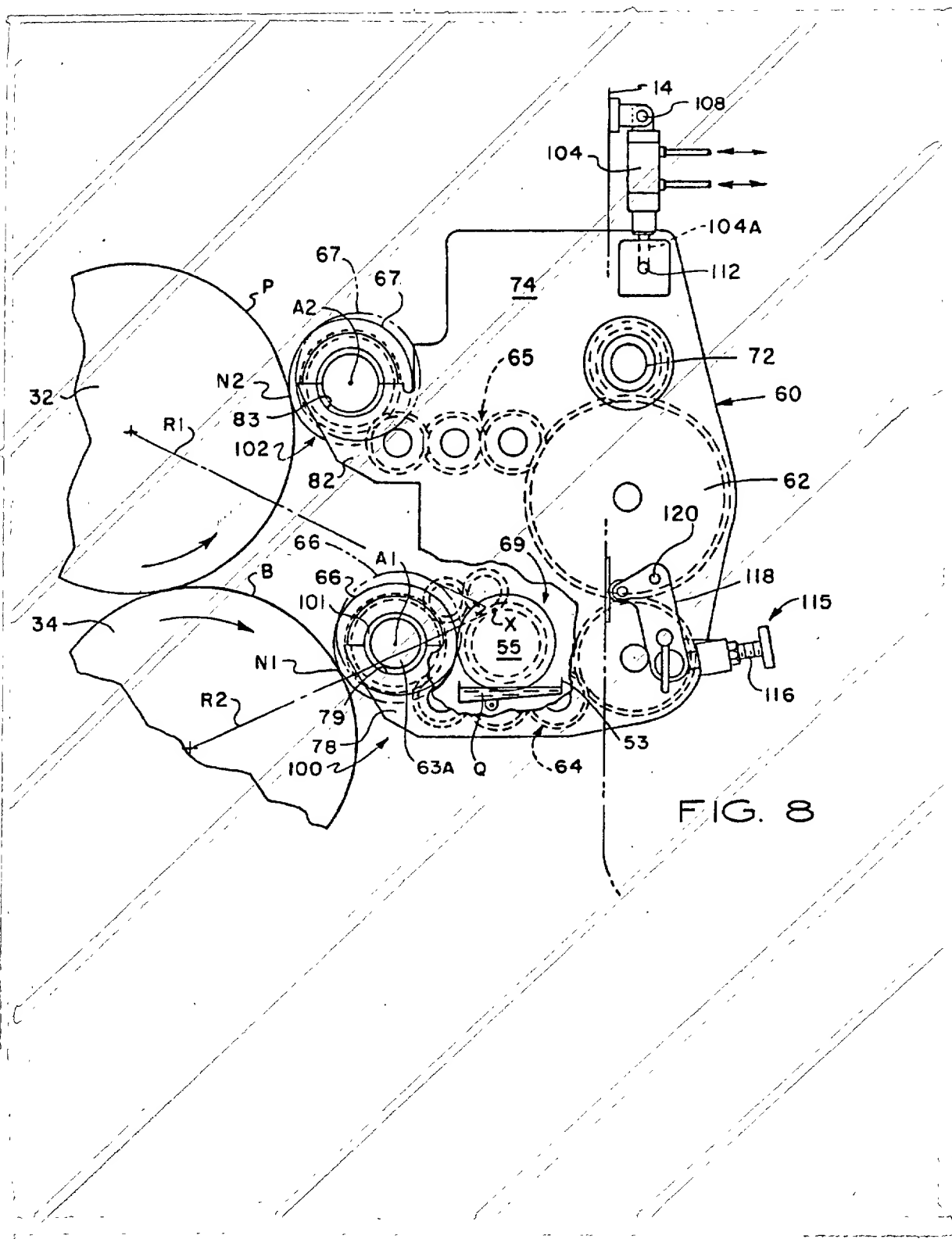
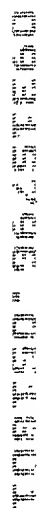


FIG. 7





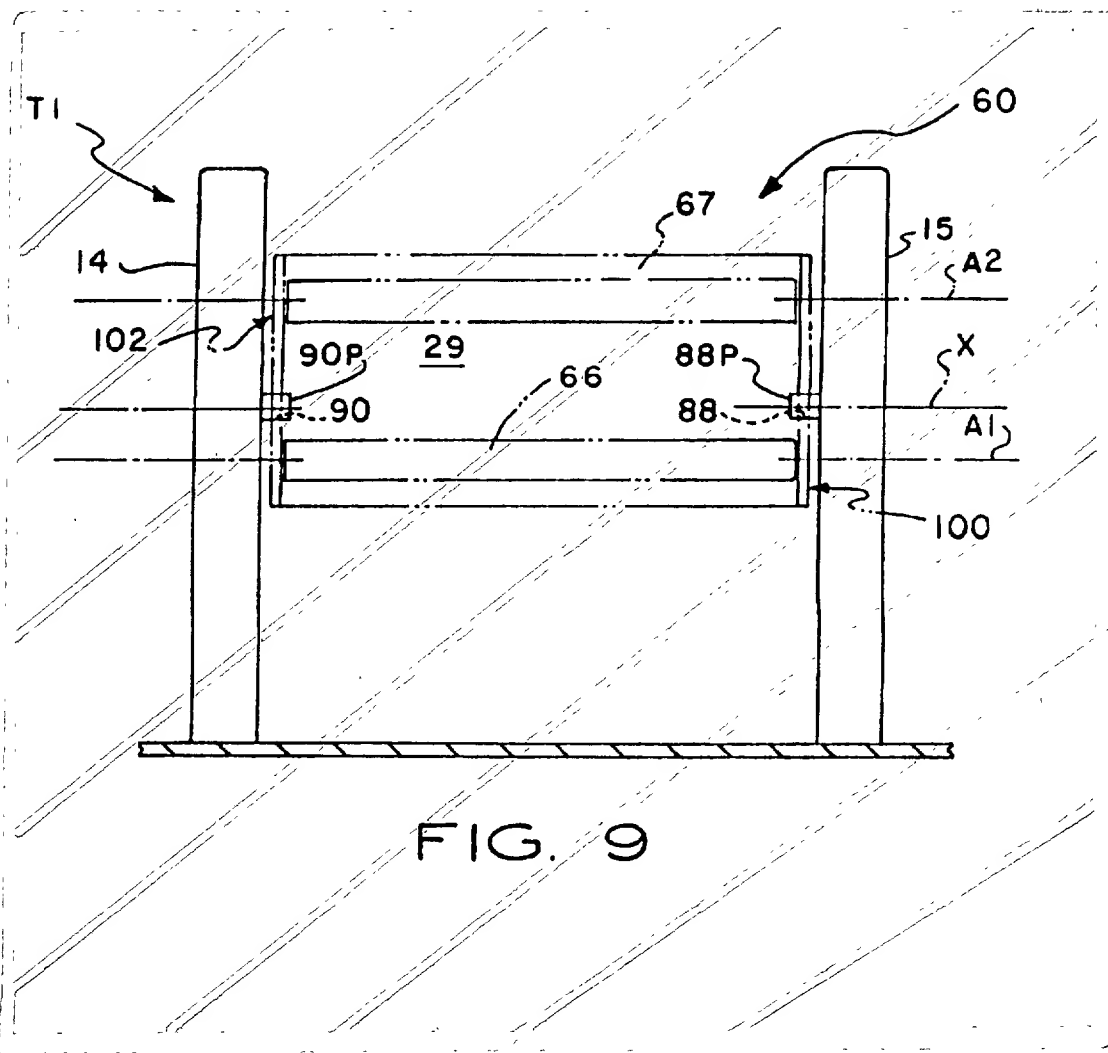
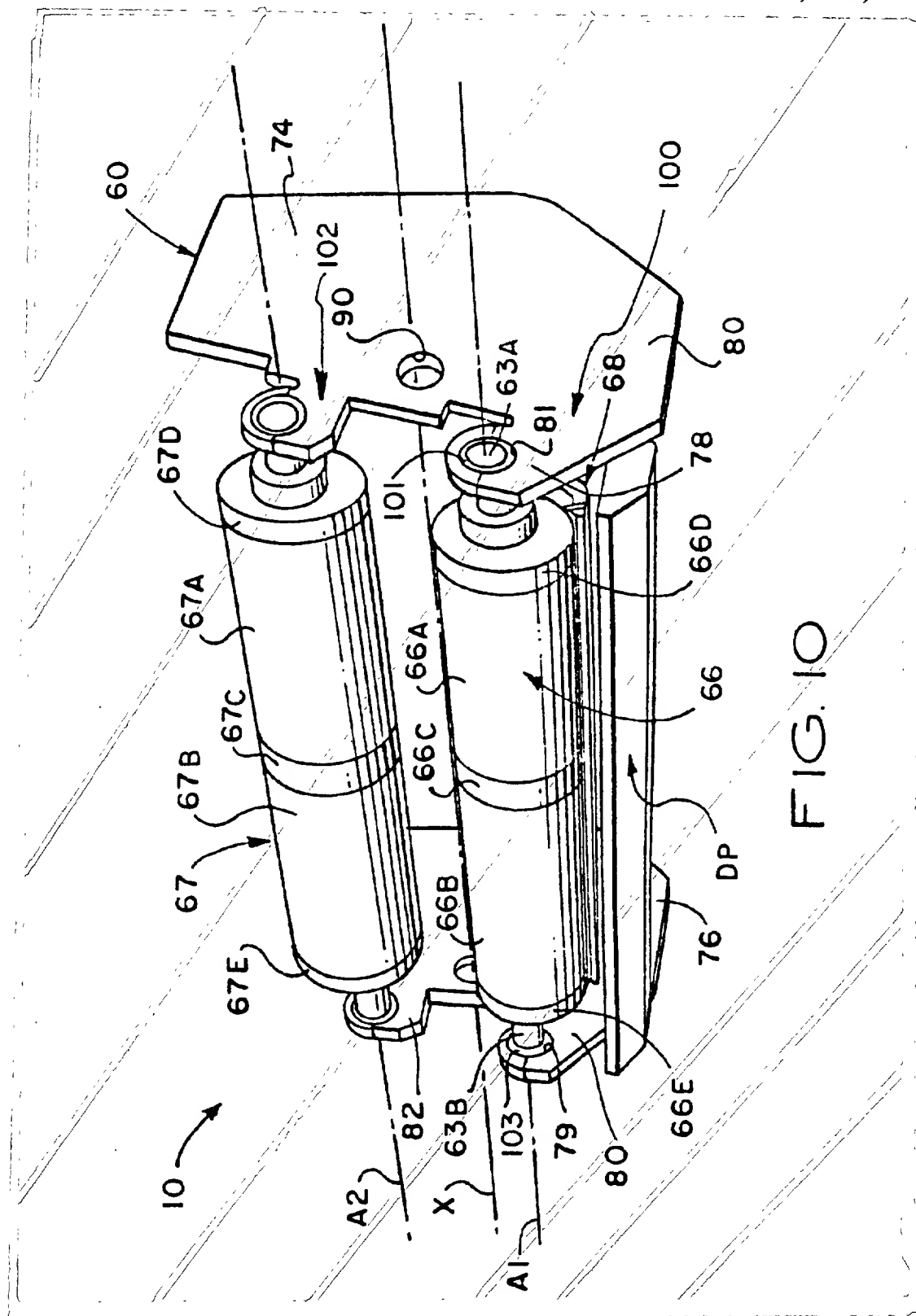


FIG. 9 is a schematic diagram of a mechanical assembly in cross-section. The assembly is mounted on a base 14. It features two vertical support posts, 100 on the left and 102 on the right. A horizontal member 29 is positioned between the posts. A bracket 60 is attached to the right post 102, with a vertical arm 67 extending upwards. A horizontal arm 66 of the bracket 60 is positioned below the member 29. A component 88 is located at the end of arm 66, with a sub-component 88P. A horizontal member 90 is positioned below member 29, with a sub-component 90P. A vertical line 15 is on the right side, with points A1 and A2 marked. A horizontal line X is also indicated. A label T1 points to the left post 100. The entire assembly is shown within a dashed rectangular frame.



TOP VIEW

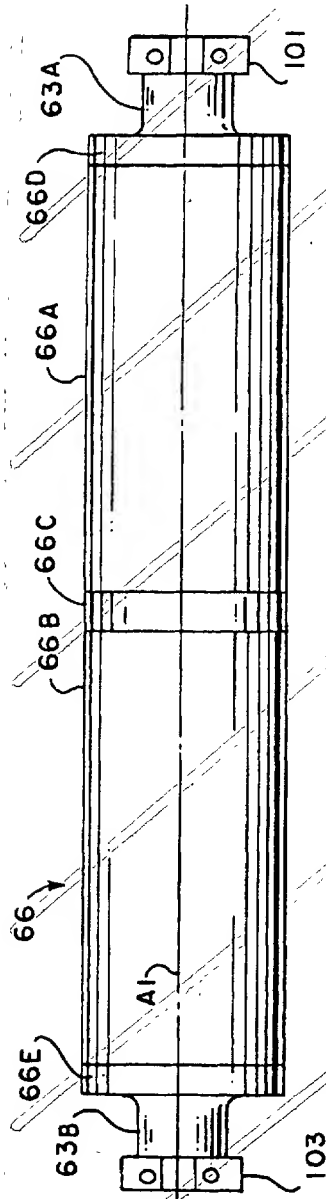


FIG. 11

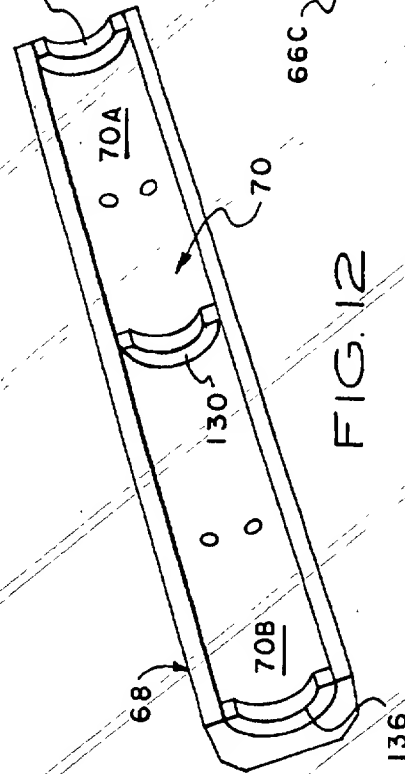


FIG. 12

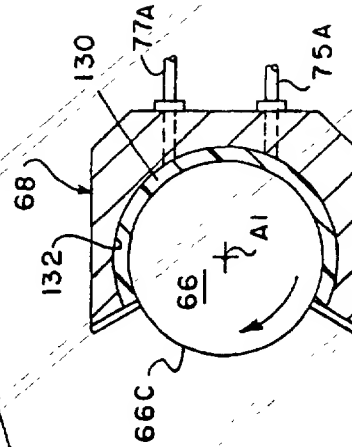
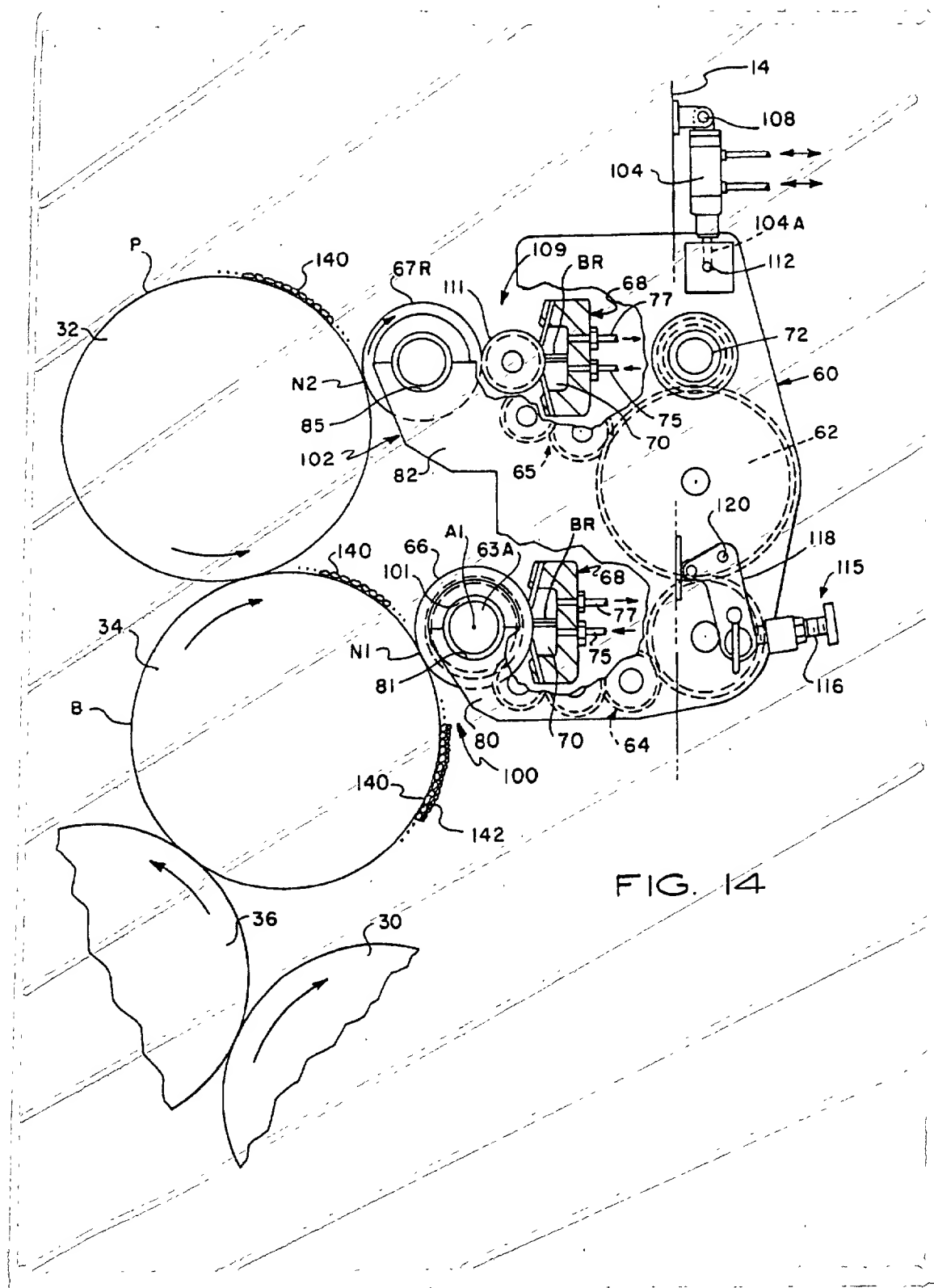
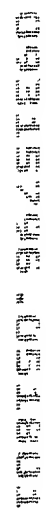
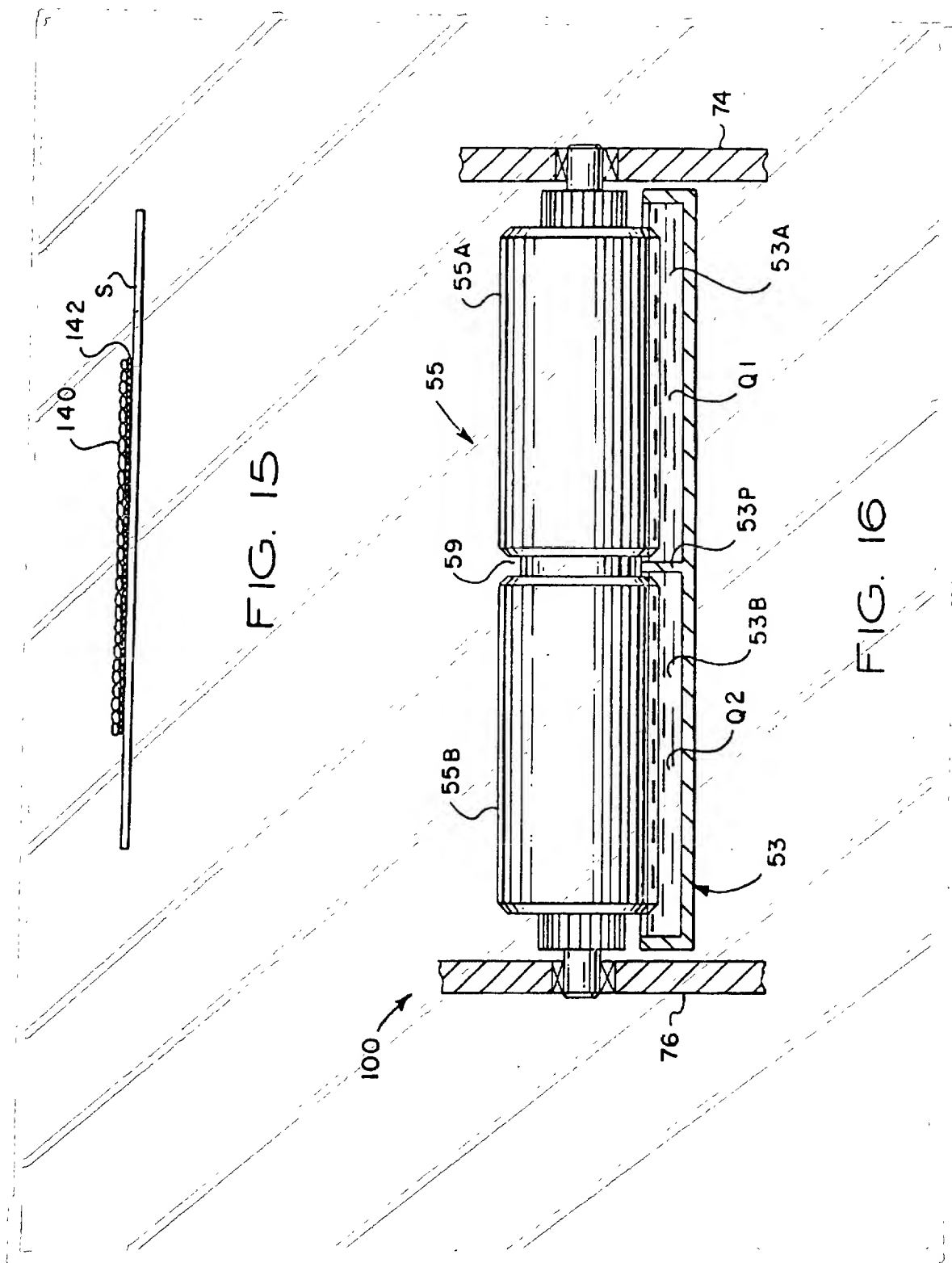
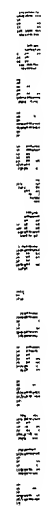


FIG. 13





TOP VIEW OF FIG. 17

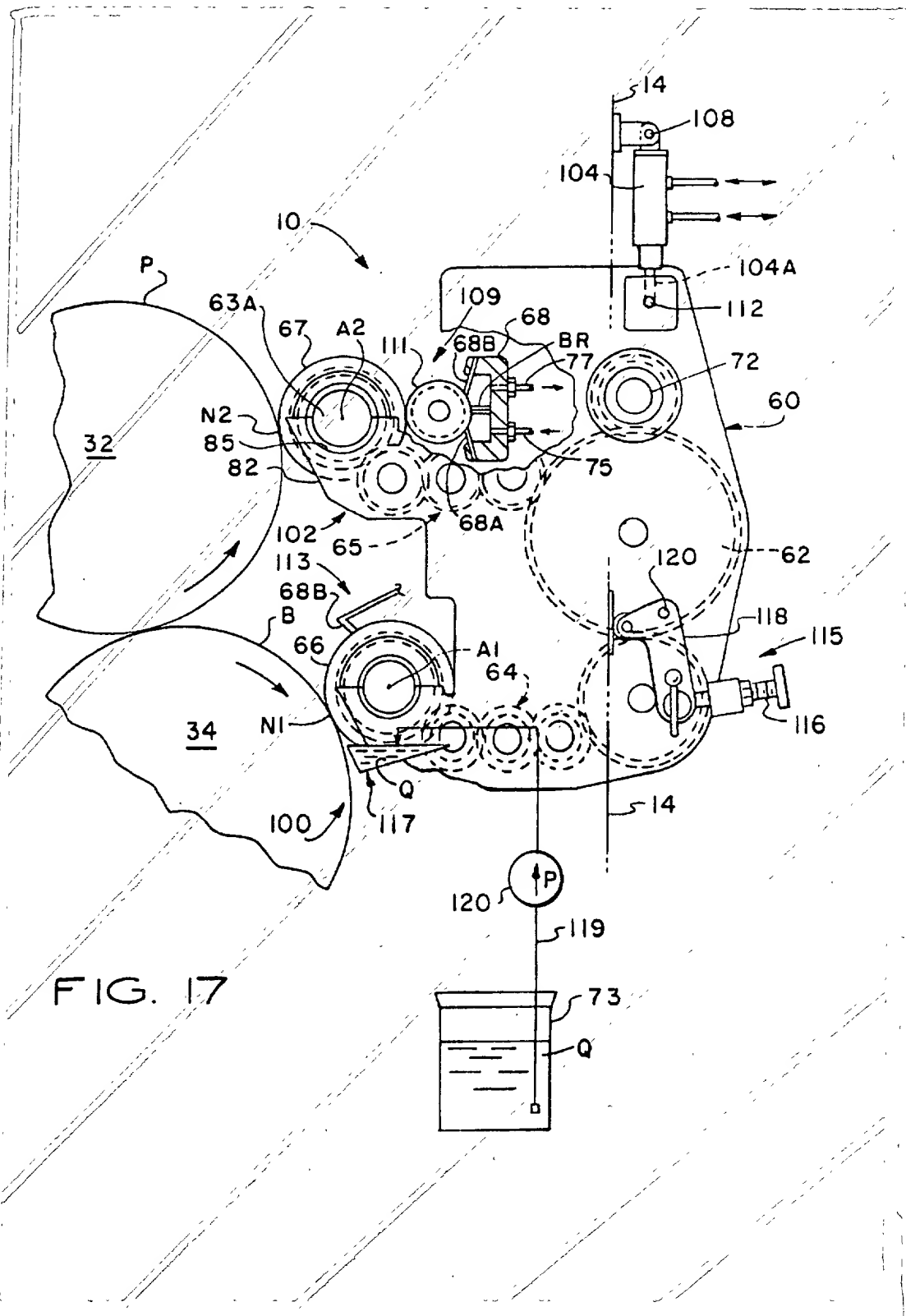
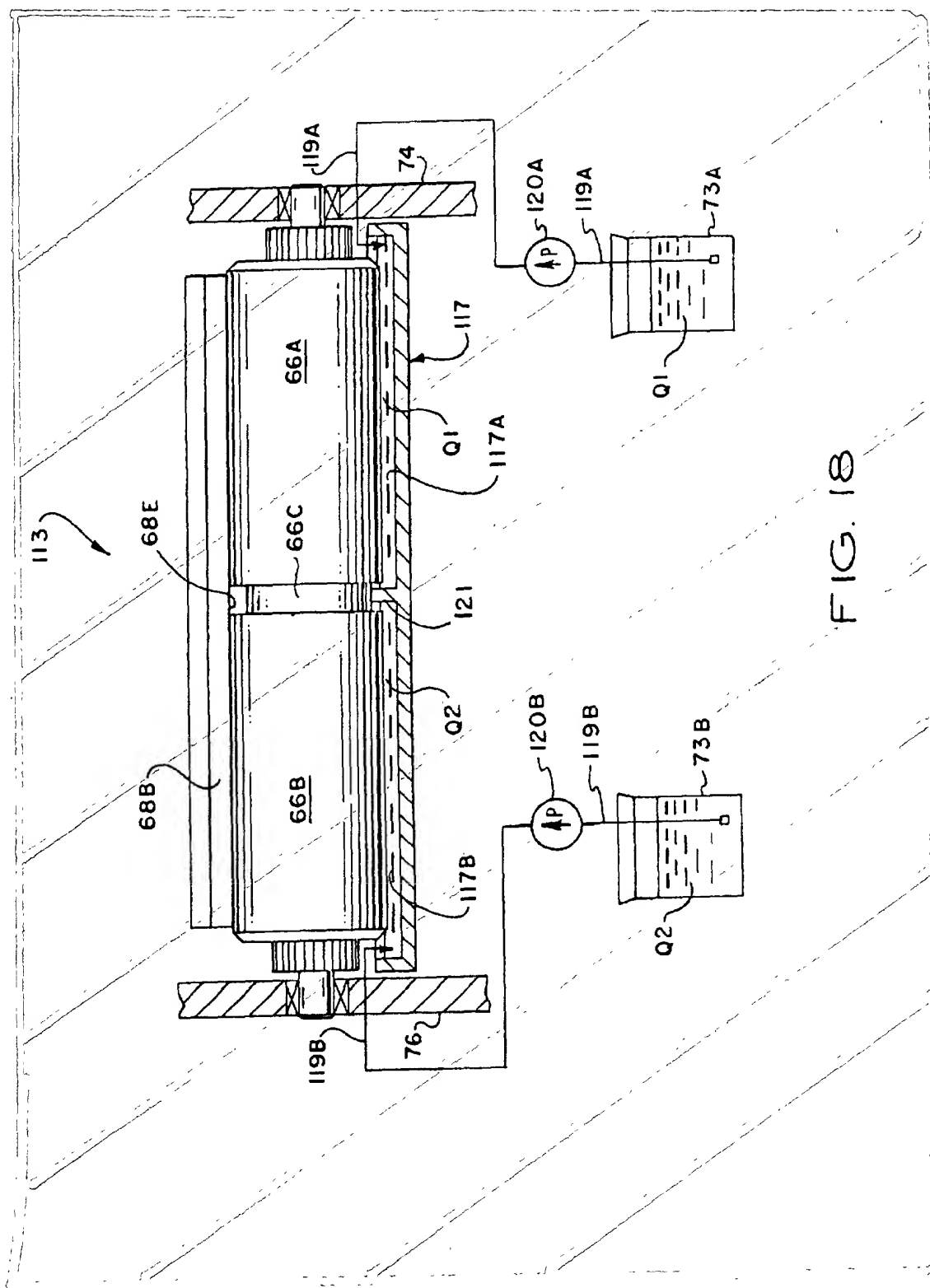


FIG. 18



RETRACTABLE PRINTING-COATING UNIT OPERABLE ON THE PLATE AND BLANKET CYLINDERS SIMULTANEOUSLY FROM THE DAMPENER SIDE OF THE FIRST PRINTING UNIT OR ANY CONSECUTIVE PRINTING UNIT OR ANY ROTARY OFFSET PRINTING PRESS

CROSS-REFERENCE TO OTHER APPLICATIONS

This application is a continuation-in-part of prior application Ser. No. 08/538,422 filed Oct. 2, 1995, now abandoned by inventors Howard W. DeMoore, Ronald M. Rendleman and John W. Bird, which in turn was a continuation-in-part of prior parent application Ser. No. 08/488,798, filed "Retractable Inking/Coating Apparatus Having Ferris Movement Between Printing Units", filed May 4, 1995 by the same inventors for which priority benefit under § 120 is claimed.

FIELD OF THE INVENTION

This invention relates generally to sheet-fed or web-fed, rotary offset lithographic printing presses, and more particularly, to a new and improved inking/coating apparatus for the in-line application of aqueous or flexographic printing inks, primer or protective/decorative coatings applied simultaneously to the plate and blanket of the first or any consecutive printing unit of any lithographic printing press.

BACKGROUND OF THE INVENTION

Conventional sheet-fed, rotary offset printing presses typically include one or more printing units through which individual sheets are fed and printed. After the last printing unit, freshly printed sheets are transferred by a delivery conveyor to the delivery end of the press where the freshly printed and/or coated sheets are collected and stacked uniformly. In a typical sheet-fed, rotary offset printing press such as the Heidelberg Speedmaster line of presses, the delivery conveyor includes a pair of endless chains carrying gripper bars with gripper fingers which grip and pull freshly printed sheets from the last impression cylinder and convey the sheets to the sheet delivery stacker.

Since the inks used with sheet-fed rotary offset printing presses are typically wet and tacky, special precautions must be taken to prevent marking and smearing of the freshly printed or coated sheets as the sheets are transferred from one printing unit to another. The printed ink on the surface of the sheet dries relatively slowly and is easily smeared during subsequent transfer between printing units. Marking, smearing and smudging can be prevented by a vacuum assisted sheet transfer apparatus as described in the following U.S. Pat. Nos: 5,113,255; 5,127,329; 5,205,217; 5,228,391; 5,243,909; and 5,419,254, all to Howard W. DeMoore, co-inventor, and manufactured and sold by Printing Research, Inc. of Dallas, Tex., U.S.A. under its trademark BACVAC™.

In some printing jobs, offsetting is prevented by applying a protective and/or decorative coating material over all or a portion of the freshly printed sheets. Some coatings are formed of a UV-curable or water-dispersed resin applied as a liquid solution over the freshly printed sheets to protect the ink from offsetting or set-off and improve the appearance of the freshly printed sheets. Such coatings are particularly desirable when decorative or protective finishes are applied in the printing of posters, record jackets, brochures, magazines, folding cartons and the like.

DESCRIPTION OF THE PRIOR ART

Various arrangements have been made for applying the coating as an in-line printing operation by using the last printing unit of the press as the coating application unit. For example, U.S. Pat. Nos. 4,270,483; 4,685,414; and 4,779,557 disclose coating apparatus which can be moved into position to permit the blanket cylinder of the last printing unit of a printing press to be used to apply a coating material over the freshly printed sheets. In U.S. Pat. No. 4,841,903 (Bird) there are disclosed coating apparatus which can be selectively moved between the plate cylinder or the blanket cylinder of the last printing unit of the press so the last printing unit can only be used for coating purposes. However, when coating apparatus of these types are being used, the last printing unit cannot be used to print ink to the sheets, but rather can only be used for the coating operation. Thus, while coating with this type of in-line coating apparatus, the printing press loses the capability of printing on the last printing unit as it is converted to a coating unit.

The coater of U.S. Pat. No. 5,107,790 (Sliker et al) is retractable along an inclined rail for extending and retracting a coater head into engagement with a blanket on the blanket cylinder. Because of its size, the rail-retractable coater can only be installed between the last printing unit of the press, and the delivery sheet stacker, and cannot be used for interunit coating. The coater of U.S. Pat. No. 4,615,293 (Jahn) provides two separate, independent coaters located on the dampener side of a converted printing unit for applying lacquer to a plate and to a rubber blanket. Consequently, although a plate and blanket are provided, the coating unit of Jahn's press is restricted to a dedicated coating operation only.

Proposals have been made for overcoming the loss of a printing unit when in-line coating is used, for example as set forth in U.S. Pat. No. 5,176,077 to Howard W. DeMoore (co-inventor and assignee), which discloses a coating apparatus having an applicator roller positioned to apply the coating material to the freshly printed sheet while the sheet is still on the last impression cylinder of the press. This allows the last printing unit to print and coat simultaneously, so that no loss of printing unit capability results.

Some conventional coatiers are rail-mounted and occupy a large amount of press space and reduce access to the press. Elaborate equipment is needed for retracting such coatiers from the operative coating position to the inoperative position, which reduces access to the printing unit.

Accordingly, there is a need for an in-line inking/coating apparatus which does not result in the loss of a printing unit, does not extend the length of the press, and which can print and coat aqueous and flexographic inks and coating materials simultaneously onto the plate and blanket on any lithographic printing unit of any lithographic printing press, including the first printing unit.

OBJECTS OF THE INVENTION

Accordingly, a general object of the present invention is to provide improved inking/coating apparatus which is capable of selectively applying ink or coating material to a plate on a plate cylinder or ink or coating material to a plate or blanket on a blanket cylinder.

A specific object of the present invention is to provide improved inking/coating apparatus of the character described which is extendable into inking/coating engagement with either a plate on a plate cylinder or to a plate or blanket on a blanket cylinder.

A related object of the present invention is to provide improved inking/coating apparatus of the character described which is capable of being mounted on any lithographic printing unit of the press and does not interfere with operator access to the plate cylinder, blanket cylinder, or adjacent printing units.

Another object of the present invention is to provide improved inking/coating apparatus of the character described, which can be moved from an operative inking/coating engagement position adjacent to a plate cylinder, or a blanket cylinder, to a non-operative, retracted position.

Still another object of the present invention is to provide improved inking/coating apparatus of the character described, which can be used for applying aqueous, flexographic and ultra-violet curable inks and/or coatings in combination with lithographic, flexographic and waterless printing processes on any rotary offset printing press.

A related object of the present invention is to provide improved inking/coating apparatus of the character described which is capable of applying aqueous or flexographic ink or coating material on one printing unit, for example the first printing unit, and drying the ink or coating material before it is printed or coated on the next printing unit so that it can be overprinted or overcoated immediately on the next printing unit with waterless, aqueous, flexographic or lithographic inks or coating materials.

Yet another object of the present invention is to provide improved inking/coating apparatus for use on a multiple color rotary offset printing press that can apply ink or coating material separately and/or simultaneously to the plate and/or blanket of a printing unit of the press from a single operative position, and from a single inking/coating apparatus.

A related object of the present invention is to provide improved inking/coating apparatus of the character described, in which virtually no printing unit adjustment or alteration is required when the inking/coating apparatus is converted from plate to blanket printing or coating and vice versa.

Another object of the present invention is to provide improved inking/coating apparatus that can be operably mounted in the dampener space of any lithographic printing unit for inking/coating engagement with either a plate on a plate cylinder or a plate or blanket on a blanket cylinder, and which does not interfere with operator movement or activities in the interunit space between printing units.

SUMMARY OF THE INVENTION

The foregoing objects are achieved by a retractable, in-line inking/coating apparatus which is mounted on the dampener side of any printing unit of a rotary offset press for movement between an operative (on-impression) inking/coating position and a retracted, disengaged (off-impression) position. The inking/coating apparatus includes an applicator roller which is movable into and out of engagement with a plate on a plate cylinder or a blanket on a blanket cylinder. The inking/coating applicator head is pivotally coupled to a printing unit by pivot pins which are mounted on the press side frames in the traditional dampener space of the printing unit in parallel alignment with the plate cylinder and the blanket cylinder. This dampener space mounting arrangement allows the inking/coating unit to be installed between any adjacent printing units on the press.

In the preferred embodiment, the applicator head includes vertically spaced pairs of cradle members with one cradle pair being adapted for supporting an inking/coating applicator roller in alignment with a plate cylinder, and the other cradle pair supporting an inking/coating applicator roller in alignment with the blanket cylinder, respectively, when the applicator head is in the operative position. Because of the pivotal support provided by the pivot pins, the applicator head can be extended and retracted within the limited space available in the traditional dampener space, without restricting operator access to the printing unit cylinders and without causing a printing unit to lose its printing capability.

When the inking/coating apparatus is used in combination with a flexographic printing plate and aqueous or flexographic ink or coating material, the water component of the aqueous or flexographic ink or coating material on the freshly printed or coated sheet is evaporated and dried by a high velocity, hot air interunit dryer and a high volume heat and moisture extractor assembly so that the freshly printed ink or coating material is dry before the sheet is printed or coated on the next printing unit. This quick drying process permits a base layer or film of ink, for example opaque white or metallic (gold, silver or other metallics) ink to be printed on the first printing unit, and then overprinted on the next printing unit without back-trapping or dot gain.

The construction and operation of the present invention will be understood from the following detailed description taken in conjunction with the accompanying drawings which disclose, by way of example, the principles and advantages of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a sheet fed, rotary offset printing press having inking/coating apparatus embodying the present invention.

FIG. 2 is a simplified perspective view of the single head, dual cradle inking/coating apparatus of the present invention.

FIG. 3 is a schematic side elevational view of the printing press of FIG. 1 having single head, dual cradle inking/coating apparatus installed in the traditional dampener position of the first, second and last printing units.

FIG. 4 is a simplified side elevational view showing the single head, dual cradle inking/coating apparatus in the operative inking/coating position for simultaneously printing on the printing plate and blanket on the fourth printing unit.

FIG. 5 is a simplified side elevational view showing the single head, dual cradle inking/coating apparatus in the operative position for spot or overall inking or coating on the blanket of the first printing unit, and showing the dual cradle inking/coating apparatus in the operative position for spot or overall inking or coating on the printing plate of the second printing unit.

FIG. 6 is a simplified side elevational view of the single head, dual cradle inking/coating apparatus of FIG. 4 and FIG. 5, partially broken away, showing the single head, dual cradle inking/coating apparatus in the operative coating position and having a sealed doctor blade reservoir assembly for spot or overall coating on the blanket.

FIG. 7 is a schematic view showing a heat exchanger and pump assembly connected to the single head, dual cradle inking/coating apparatus for circulating temperature controlled ink or coating material to the inking/coating apparatus.

FIG. 8 is a side elevational view, partially broken away, and similar to FIG. 6 which illustrates an alternative coating head arrangement.

FIG. 9 is a simplified elevational view of a printing unit which illustrates pivotal coupling of the inking/coating apparatus on the printing unit side frame members;

FIG. 10 is a view similar to FIG. 2 in which a pair of split applicator rollers are mounted in the upper cradle and lower cradle, respectively;

FIG. 11 is a side elevational view of a split applicator roller;

FIG. 12 is a perspective view of a doctor blade reservoir which is centrally partitioned by a seal element;

FIG. 13 is a sectional view showing sealing engagement of the split applicator roller against the partition seal element of FIG. 12;

FIG. 14 is a view similar to FIG. 8 which illustrates an alternative inking/coating embodiment;

FIG. 15 is a simplified side elevational view of a substrate which has a bronzed-like finish which is applied by simultaneous operation of the dual applicator roller embodiment of FIG. 14;

FIG. 16 is a side elevational view, partly in section, of a pan roller having separate transfer surfaces mounted on a split fountain pan;

FIG. 17 is a simplified side elevational view of the dual cradle inking/coating apparatus, partially broken away, which illustrates an alternative inking/coating head apparatus featuring a single doctor blade assembly, anilox applicator roller mounted on the lower cradle; and

FIG. 18 is a side elevational view, partly in section, of a single doctor blade anilox applicator roller assembly having separate transfer surfaces, and a split fountain pan having separate fountain compartments, with the separate fountain compartments being supplied with different inks or coating materials from separate off-press sources.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

As used herein, the term "processed" refers to printing and coating methods which can be applied to either side of a substrate, including the application of lithographic, waterless, UV-curable, aqueous and flexographic inks and/or coatings. The term "substrate" refers to sheet and web material. Also, as used herein, the term "waterless printing plate" refers to a printing plate having image areas and non-image areas which are oleophilic and oleophobic, respectively. "Waterless printing ink" refers to an oil-based ink which does not contain a significant aqueous component. "Flexographic plate" refers to a flexible printing plate having a relief surface which is wettable by flexographic ink or coating material. "Flexographic printing ink or coating material" refers to an ink or coating material having a base constituent of either water, solvent or UV-curable liquid. "UV-curable lithographic printing ink and coating material" refers to oil-based printing inks and coating materials that can be cured (dried) photomechanically by exposure to ultraviolet radiation, and that have a semi-paste or gel-like consistency. "Aqueous printing ink or coating material" refers to an ink or coating material that predominantly contains water as a solvent, diluent or vehicle. A "relief plate" refers to a printing plate having image areas which are raised relative to non-image areas which are recessed.

As shown in the exemplary drawings, the present invention is embodied in a new and improved in-line inking/coating apparatus, herein generally designated 10, for applying aqueous, flexographic or UV-curable inks or protective and/or decorative coatings to sheets or webs printed in a

sheet-fed or web-fed, rotary offset printing press, herein generally designated 12. In this instance, as shown in FIG. 1, the inking/coating apparatus 10 is installed in a four unit rotary offset printing press 12, such as that manufactured by Heidelberg Druckmaschinen AG of Germany under its designation Heidelberg Speedmaster SM102 (40", 102 cm).

The press 12 includes a press frame 14 coupled at one end, herein the right end, to a sheet feeder 16 from which sheets, herein designated S, are individually and sequentially fed into the press, and at the opposite end, with a sheet delivery stacker 20 in which the freshly printed sheets are collected and stacked. Interposed between the sheet feeder 16 and the sheet delivery stacker 20 are four substantially identical sheet printing units 22, 24, 26 and 28 which can print four different colors onto the sheets as they are transferred through the press 12. The printing units are housed within printing towers T1, T2, T3 and T4 formed by side frame members 14, 15. Each printing tower has a delivery side 25 and a dampener side 27. A dampener space 29 is partially enclosed by the side frames on the dampener side of the printing unit.

As illustrated, the printing units 22, 24, 26 and 28 are substantially identical and of conventional design. The first printing unit 22 includes an in-feed transfer cylinder 30, a plate cylinder 32, a blanket cylinder 34 and an impression cylinder 36, all supported for rotation in parallel alignment between the press side frames 14, 15 which define printing unit towers T1, T2, T3 and T4. Each of the first three printing units 22, 24 and 26 have a transfer cylinder 38 disposed to transfer the freshly printed sheets from the adjacent impression cylinder and transfer the freshly printed sheets to the next printing unit via an intermediate transfer drum 40.

The last printing unit 28 includes a delivery cylinder 42 mounted on a delivery shaft 43. The delivery cylinder 42 supports the freshly printed sheet 18 as it is transferred from the last impression cylinder 36 to a delivery conveyor system, generally designated 44, which transfers the freshly printed sheet to the sheet delivery stacker 20. To prevent smearing during transfer, a flexible covering is mounted on the delivery cylinder 42, as described and claimed in U.S. Pat. No. 4,402,267 to Howard W. DeMoore, which is incorporated herein by reference. The flexible covering is manufactured and sold by Printing Research, Inc. of Dallas, Tex., U.S.A., under its trademark SUPER BLUE®. Optionally, a vacuum-assisted sheet transfer assembly manufactured and sold by Printing Research, Inc. of Dallas, Tex., U.S.A., under its trademark BACVAC® can be substituted for the delivery transfer cylinder 42 and flexible covering.

The delivery conveyor system 44 as shown in FIG. 2 is of conventional design and includes a pair of endless delivery gripper chains 46, only one of which is shown carrying at regular spaced locations along the chains, laterally disposed gripper bars having gripper fingers used to grip the leading edge of a freshly printed or coated sheet 18 after it leaves the nip between the impression cylinder 36 and delivery cylinder 42 of the last printing unit 28. As the leading edge is gripped by the gripper fingers, the delivery chains 46 pull the sheet away from the last impression cylinder 36 and convey the freshly printed or coated sheet to the sheet delivery stacker 20.

Prior to reaching the delivery sheet stacker, the freshly printed and/or coated sheets S pass under a delivery dryer 48 which includes a combination of infra-red thermal radiation, high velocity hot air flow and a high performance heat and moisture extractor for drying the ink and/or the protective/

decorative coating. Preferably, the delivery dryer 48, including the high performance heat and moisture extractor is constructed as described in U.S. application Ser. No. 08/116,711, filed Sep. 3, 1993, entitled "Infra-Red Forced Air Dryer and Extractor" by Howard C. Secor, Ronald M. Rendleman and Paul D. Copenhaver, commonly assigned to the assignee of the present invention, Howard W. DeMoore, and licensed to Printing Research, Inc. of Dallas, Tex., U.S.A., which manufactures and markets the delivery dryer 48 under its trademark AIR BLANKET™.

In the exemplary embodiment shown in FIG. 3, the first printing unit 22 has a flexographic printing plate PF mounted on the plate cylinder, and therefore neither an inking roller train nor a dampening system is required. A flexographic printing plate PF is also mounted on the plate cylinder of the second printing unit 24. The form rollers of the inking roller train 52 shown mounted on the second printing unit 24 are retracted and locked off to prevent plate contact. Flexographic ink is supplied to the flexographic plate PF of the second printing unit 24 by the inking/coating apparatus 10.

A suitable flexographic printing plate PF is offered by E.I. du Pont de Nemours of Wilmington, Del., U.S.A., under its trademark CYREL®. Another source is BASF Aktiengesellschaft of Ludwigshafen, Germany, which offers a suitable flexographic printing plate under its trademark NYLOF-LEX®.

The third printing unit 26 as illustrated in FIG. 3 and FIG. 4 is equipped for lithographic printing and includes an inking apparatus 50 having an inking roller train 52 arranged to transfer ink Q from an ink fountain 54 to a lithographic plate P mounted on the plate cylinder 32. This is accomplished by a fountain roller 56 and a ductor roller 57. The fountain roller 56 projects into the ink fountain 54, whereupon its surface picks up ink. The lithographic printing ink Q is transferred from the fountain roller 56 to the inking roller train 52 by the ductor roller 57. The inking roller train 52 supplies ink Q to the image areas of the lithographic printing plate P.

The lithographic printing ink Q is transferred from the lithographic printing plate P to an ink receptive blanket B which is mounted on the blanket cylinder 34. The inked image carried on the blanket B is transferred to a substrate S as the substrate is transferred through the nip between the blanket cylinder 34 and the impression cylinder 36.

The inking roller arrangement 52 illustrated in FIG. 3 and FIG. 4 is exemplary for use in combination with lithographic ink printing plates P. It is understood that a dampening system 58 having a dampening fluid reservoir DF is coupled to the inking roller train 52 (FIG. 4), but is not required for waterless or flexographic printing.

The plate cylinder 32 of printing unit 28 is equipped with a waterless printing plate PW. Waterless printing plates are also referred to as dry planographic printing plates and are disclosed in the following U.S. Pat. Nos.: 3,910,187; Re. 30,670; 4,086,093; and 4,853,313. Suitable waterless printing plates can be obtained from Toray Industries, Inc. of Tokyo, Japan. A dampening system is not used for waterless printing, and waterless (oil-based) printing ink is used. The waterless printing plate PW has image areas and non-image areas which are oleophilic/hydrophilic and oleophobic/hydrophobic, respectively. The waterless printing plate PW is engraved or etched, with the image areas being recessed with respect to the non-image areas. The image area of the waterless printing plate PW is rolled up with the flexographic or aqueous printing ink which is transferred by the

applicator roller 66. Both aqueous and oil-based inks and coatings are repelled from the non-image areas, and are retained in the image areas. The printing ink or coating is then transferred from the image areas to an ink or coating receptive blanket B and is printed or coated onto a substrate S.

For some printing jobs, a flexographic plate PF or a waterless printing plate PW is mounted over a resilient packing such as the blanket B on the blanket cylinder 34, for example as indicated by phantom lines in printing unit 22 of FIG. 5. An advantage of this alternative embodiment is that the waterless plate PW or the flexographic plate PF are resiliently supported over the blanket cylinder by the underlying blanket B or other resilient packing. The radial deflection and give of the resilient blanket B provides uniform, positive engagement between the applicator roller 66 and a flexographic plate or waterless plate.

In that arrangement, a plate is not mounted on the plate cylinder 32; instead, a waterless plate PW is mounted on the blanket cylinder, and the inked image on the waterless printing plate is not offset but is instead transferred directly from the waterless printing plate PW to the substrate S. The water component of flexographic ink on the freshly printed sheet is evaporated by high velocity, hot air dryers and high volume heat and moisture extractors so that the freshly printed aqueous or flexographic ink is dried before the substrate is printed on the next printing unit.

Referring now to FIG. 2, FIG. 3 and FIG. 9, the inking/coating apparatus 10 is pivotally mounted on the side frames 14, 15 for rotation about an axis X. The inking/coating apparatus 10 includes a frame 60, a hydraulic motor 62, a lower gear train 64, an upper gear train 65, an applicator roller 66, a sealed doctor blade assembly 68 (FIG. 6), and a drip pan DP, all mounted on the frame 60. The external peripheral surface of the applicator roller 66 is wetted by contact with liquid coating material or ink contained in a reservoir 70.

The hydraulic motor 62 drives the applicator roller 66 synchronously with the plate cylinder 32 and the blanket cylinder 34 in response to an RPM control signal from the press drive (not illustrated) and a feedback signal developed by a tachometer 72. While a hydraulic drive motor is preferred, other drive means such as an electric drive motor or an equivalent can be used.

When using waterless printing plate systems, the temperature of the waterless printing ink and of the waterless printing plate must be closely controlled for good image reproduction. For example, for waterless offset printing with TORAY waterless printing plates PW, it is absolutely necessary to control the waterless printing plate surface and waterless ink temperature to a very narrow range, for example 24° C. (75° F) to 27° C. (80° F).

Referring to FIG. 7, the reservoir 70 is supplied with ink or coating which is temperature controlled by a heat exchanger 71. The temperature controlled ink or coating material is circulated by a positive displacement pump, for example a peristaltic pump, through the reservoir 70 and heat exchanger 71 from a source 73 through a supply conduit 75 and a return conduit 77. The heat exchanger 71 cools or heats the ink or coating material and maintains the ink or coating and the printing plate within the desired narrow temperature range.

According to one aspect of the present invention, aqueous/flexographic ink or coating material is supplied to the applicator roller 66, which transfers the aqueous/flexographic ink or coating material to the printing plate

(FIG. 7), which may be a waterless printing plate or a flexographic printing plate. When the inking/coating apparatus is used for applying aqueous/flexographic ink or coating material to a waterless printing plate PW, the inking roller train 52 is not required, and is retracted away from the printing plate. Because the viscosity of aqueous/flexographic printing ink or coating material varies with temperature, it is necessary to heat or cool the aqueous/flexographic printing ink or coating material to compensate for ambient temperature variations to maintain the ink viscosity in a preferred operating range.

For example, the temperature of the printing press can vary from around 60° F. (15° C.) in the morning, to around 85° F. (29° C.) or more in the afternoon. The viscosity of aqueous/flexographic printing ink or coating material can be marginally high when the ambient temperature of the press is near 60° F. (15° C.), and the viscosity can be marginally low when the ambient temperature of the press exceeds 85° F. (29° C.). Consequently, it is desirable to control the temperature of the aqueous/flexographic printing ink or coating material so that it will maintain the surface temperature of waterless printing plates within the specified temperature range. Moreover, the ink/coating material temperature should be controlled to maintain the tack of the aqueous/flexographic printing ink or coating material within a desired range when the ink or coating material is being used in connection with flexographic printing processes.

The applicator roller 66 is preferably an anilox fluid metering roller which transfers measured amounts of printing ink or coating material to a plate or blanket. The surface of an anilox roller is engraved with an array of closely spaced, shallow depressions referred to as "cells". Ink or coating from the reservoir 70 flows into the cells as the anilox roller turns through the reservoir. The transfer surface of an anilox roller is "doctored" (wiped or scraped) by dual doctor blades 68A, 68B to remove excess ink or coating material. The ink or coating metered by the anilox roller is that contained within the cells. The dual doctor blades 68A, 68B also seal the supply reservoir 70.

The anilox applicator roller 66 is cylindrical and may be constructed in various diameters and lengths, containing cells of various sizes and shapes. The volumetric capacity of an anilox roller is determined by cell size, shape and number of cells per unit area. Depending upon the intended application, the cell pattern may be fine (many small cells per unit area) or coarse (fewer large cells per unit area).

By supplying the ink or coating material through the inking/coating apparatus 10, more ink or coating material can be applied to the sheet S as compared with the inking roller train of a lithographic printing unit. Moreover, color intensity is stronger and more brilliant because the aqueous or flexographic ink or coating material is applied at a much heavier film thickness or weight than can be applied by the lithographic process, and the aqueous or flexographic colors are not diluted by dampening solution.

Preferably, the sealed doctor blade assembly 68 is constructed as described in U.S. Pat. No. 5,176,077 to Howard W. DeMoore, co-inventor and assignee, which is incorporated herein by reference. An advantage of using a sealed reservoir is that fast drying ink or coating material can be used. Fast-drying ink or coating material can be used in an open fountain 53 (see FIG. 8); however, open air exposure causes the water and solvents in the fast-drying ink or coating material to evaporate faster, thus causing the ink or coating material to dry prematurely and change viscosity. Moreover, an open fountain emits unwanted odors into the

press room. When the sealed doctor blade assembly is utilized, the pump (FIG. 7) which circulates ink or coating material to the doctor blade head is preferably a peristaltic pump, which does not inject air into the feeder lines, which supply the ink or coating reservoir 70 and helps to prevent the formation of air bubbles and foam within the ink or coating material.

An inking/coating apparatus 10 having an alternative applicator roller arrangement is illustrated in FIGS. 10-13. In this arrangement, the engraved metering surface of the anilox applicator rollers 66, 67 are partitioned by smooth seal surfaces 66C which separates a first engraved peripheral surface portion 66A from a second engraved peripheral surface portion 66B. Likewise, smooth seal surfaces 66D, 66E are formed on the opposite end portions of the applicator roller 66 for engaging end seals 134, 136 (FIG. 12) of the doctor blade reservoir. The upper applicator roller 67 has engraved anilox metering surfaces 67A and 67B which are separated by a smooth seal band 67C.

Referring now to FIG. 12 and FIG. 13, the reservoir 70 of the doctor blade head 68 is partitioned by a curved seal element 130 to form two separate chambers 70A, 70B. The seal element 130 is secured to the doctor blade head within an annular groove 132. The seal element 130 is preferably made of polyurethane foam or other durable, resilient foam material. The seal element 130 is engaged by the seal band 66, thus forming a rotary seal which blocks the leakage of ink or coating material from one reservoir chamber into the other reservoir chamber. Moreover, the seal band provides an unprinted or uncoated area which separates the printed or coated areas from each other, which is needed for work and turn printing jobs or other printing jobs which print two or more separate images onto the same substrate.

Another advantage of the split applicator roller embodiment is that it enables two or more flexographic inks or coating materials to be printed simultaneously within the same lithographic printing unit. That is, the reservoir chambers 70A, 70B of the upper doctor blade assembly can be supplied with gold ink and silver ink, for example, while the reservoir chambers 70A, 70B of the lower doctor blade assembly can be supplied with inks of two additional colors, for example opaque white ink and blue ink. This permits the opaque white ink to be overprinted with the gold ink, and the blue ink to be overprinted with the silver ink on the same printing unit on any lithographic press.

Moreover, a catalyst can be used in the upper doctor blade reservoir and a reactive ink or coating material can be used in the lower doctor blade reservoir. This can provide various effects, for example improved chemical resistance and higher gloss levels.

The split applicator roller sections 67A, 67B in the upper cradle position can be used for applying two separate inks or coating materials simultaneously, for example flexographic, aqueous and ultra-violet curable inks or coating materials, to separate surface areas of the plate, while the lower applicator roller sections 66A, 66B can apply an initiator layer and a microencapsulated layer simultaneously to separate blanket surface areas. Optionally, the metering surface portions 66A, 66B can be provided with different cell metering capacities for providing different printing effects which are being printed simultaneously. For example, the screen line count on one half-section of an anilox applicator roller is preferably in the range of 200-600 lines per inch (79-236 lines per cm) for half-tone images, and the screen line count of the other half-section is preferably in the range of 100-300 lines per inch (39-118 lines per cm) for overall coverage, high

weight applications such as opaque white. This split arrangement in combination with dual applicator rollers is particularly advantageous when used in connection with "work and turn" printing jobs.

Referring again to FIG. 8, instead of using the sealed doctor blade reservoir assembly 68 as shown in FIG. 6, an open fountain assembly 69 is provided by the fountain pan 53 which contains a volume of liquid ink Q or coating material. The liquid ink or coating material is transferred to the applicator roller 66 by a pan roller 55 which turns in contact with ink Q or coating material in the fountain pan. If a split applicator roller is used, the pan roller 55 is also split, and the pan is divided into two pan sections 53A, 53B by a separator plate 53P, as shown in FIG. 16.

In the alternative embodiment of FIG. 16, the pan roller 55 is divided into two pan roller sections 55A, 55B by a centrally located, annular groove 59. The separator plate 53P is received within and centrally aligned with the groove 59, but does not touch the adjoining roller faces. By this arrangement, two or more inks or coating materials Q1, Q2 are contained within the open pan sections 55A, 55B for transfer by the split pan roller sections 53A, 53B, respectively. This permits two or more flexographic inks or coating materials to be transferred to two separate image areas on the plate or on the blanket of the same printing unit. This arrangement is particularly advantageous for work and turn printing jobs or other printing jobs which print two or more separate images onto the same substrate.

The frame 60 of the inking/coating apparatus 10 includes side support members 74, 76 which support the applicator roller 66, gear train 64, gear train 65, doctor blade assembly 68 and the drive motor 62. The applicator roller 66 is mounted on stub shafts 63A, 63B which are supported at opposite ends on a lower cradle assembly 100 formed by a pair of side support members 78, 80 which have sockets 79, 81 and retainer caps 101, 103. The stub shafts are received in roller bearings 105, 107 which permit free rotation of the applicator roller 66 about its longitudinal axis A1 (axis A2 in the upper cradle). The retainer caps 101, 103 hold the stub shafts 63A, 63B and bearings 105, 107 in the sockets 79, 81 and hold the applicator roller 66 in parallel alignment with the pivot axis X.

The side support members 74, 76 also have an upper cradle assembly 102 formed by a pair of side support members 82, 84 which are vertically spaced with respect to the lower side plates 78, 80. Each cradle 100, 102 has a pair of sockets 79, 81 and 83, 85, respectively, for holding an applicator roller 66, 67 for spot coating or inking engagement with the printing plate P on the plate cylinder 32 (FIG. 4) or with a printing plate P or a blanket B on the blanket cylinder 34.

Preferably, the applicator roller 67 (FIG. 8, FIG. 9) the upper cradle (plate) position is an anilox roller having a resilient transfer surface. In the dual cradle arrangement as shown in FIG. 2, the press operator can quickly change from blanket inking/coating to plate inking/coating within minutes, since it is only necessary to release, remove and reposition or replace the applicator roller 66.

The capability to simultaneously print in the flexographic mode, the aqueous mode, the waterless mode, or the lithographic mode on different printing units of the same lithographic press and to print or coat from either the plate position or the blanket position on any one of the printing units is referred to herein as the LITHOFLEX™ printing process or system. LITHOFLEX™ is a trademark of Printing Research, Inc. of Dallas, Tex., U.S.A., exclusive licensee of the present invention.

Referring now to FIG. 14, an inking/coating apparatus 10 having an inking/coating assembly 109 of an alternative design is installed in the upper cradle position for applying ink and/or coating material to a plate P on the plate cylinder 32. According to this alternative embodiment, an applicator roller 67R having a resilient transfer surface is coupled to an anilox fluid metering roller which transfers measured amounts of printing ink or coating material to the plate P. The anilox roller 111 has a transfer surface constructed of metal, ceramic or composite material which is engraved with cells. The resilient applicator roller 67R is interposed in transfer engagement with the plate P and the metering surface of the anilox roller 111. The resilient transfer surface of the applicator roller 67R provides uniform, positive engagement with the plate.

Referring now to FIG. 17, an inking/coating apparatus 10 having an alternative inking/coating assembly 113 is installed in the lower cradle assembly 100 for applying flexographic or aqueous ink and/or coating material Q to a plate or blanket mounted on the blanket cylinder 34. Instead of using the sealed, dual doctor blade reservoir assembly 68 as shown in FIG. 6, an open, single doctor blade anilox roller assembly 113 is supplied with liquid ink Q or coating material contained in an open fountain pan 117. The liquid ink or coating material Q is transferred to the engraved transfer surface of the anilox roller 66 as it turns in the fountain pan 117. Excess ink or coating material Q is removed from the engraved transfer surface by a single doctor blade 68B. The liquid ink or coating material Q is pumped from an off-press source, for example the drum 73 shown in FIG. 17, through a supply conduit 119 into the fountain pan 117 by a pump 120.

For overall inking or coating jobs, the metering transfer surface of the anilox roller 66 extends over its entire peripheral surface. However, for certain printing jobs which print two or more separate images onto the same substrate, for example work and turn printing jobs, the metering transfer surface of the anilox applicator roller 66 is partitioned by a centrally located, annular undercut groove 66C which separates first and second metering transfer surfaces 66A, 66B as shown in FIG. 11 and FIG. 18.

The single doctor blade 68B has an edge 68E which wipes simultaneously against the split metering transfer surfaces 66A, 66B. In this single blade, split anilox roller embodiment 113, it is necessary to provide dual supply sources, for example drums 73A, 73B, dual supply lines 119A, 119B, and dual pumps 120A, 120B. Moreover, the fountain pan 117 is also split, and the pan 117 is divided into two pan sections 117A, 117B by a separator plate 121, as shown in FIG. 18. The separator plate 121 is centrally aligned with the undercut groove 66C, but does not touch the adjoining roller faces.

Although the single blade, split anilox applicator roller assembly 113 is shown mounted in the lower cradle position (FIG. 17), it should be understood that the single blade, split anilox applicator roller assembly 113 can be mounted and used in the upper cradle position, as well.

According to another aspect of the present invention, the inking/coating apparatus 10 is pivotally coupled on horizontal pivot pins 88P, 90P which allows the single head, dual cradle inking/coating apparatus 10 to be mounted on any lithographic printing unit. Referring to FIG. 9, the horizontal pivot pins 88P, 90P are mounted within the traditional dampener space 29 of the printing unit and are secured to the press side frames 14, 15, respectively. Preferably, the pivot support pins 88P, 90P are secured to the press side frames by

a threaded fastener. The pivot support pins are received within circular openings 88, 90 which intersect the side support members 74, 76 of the inking/coating apparatus 10. The horizontal support pins 88P, 90P are disposed in parallel alignment with rotational axis X and with the plate cylinder and blanket cylinder, and are in longitudinal alignment with each other.

Preferably, the pivot pins 88P, 90P are located in the dampener space 29 so that the rotational axes A1, A2 of the applicator rollers 66, 67 are elevated with respect to the nip contact points N1, N2. By that arrangement, the transfer point between the applicator roller 66 and a blanket on the blanket cylinder 34 (as shown in FIG. 8) and the transfer point between the applicator roller 66 and a plate on the plate cylinder 32 (as shown in FIG. 5) are above the radius lines R1, R2 of the plate cylinder and the blanket cylinder, respectively. This permits the inking/coating apparatus 10 to move clockwise to retract the applicator roller 66 to an off-impression position relative to the blanket cylinder in response to a single extension stroke of the power actuator arms 104A, 106A. Similarly, the applicator roller 66 is moved counterclockwise to the on-impression operative position as shown in FIGS. 4, 5, 6 and 8 by a single retraction stroke of the actuator arms 104A, 106A, respectively.

Preferably, the pivot pins are made of steel and the side support members are made of aluminum, with the steel pivot pins and the aluminum collar portion bordering the circular openings 88, 90 forming a low friction journal. By this arrangement, the inking/coating apparatus 10 is freely rotatable clockwise and counterclockwise with respect to the pivot pins 88P, 90P. Typically, the arc length of rotation is approximately 60 mils (about 1.5 mm). Consequently, the inking/coating apparatus 10 is almost totally enclosed within the dampener space 29 of the printing unit in the on-impression position and in the off-impression position.

The cradle assemblies 100 and 102 position the applicator roller 66 in inking/coating alignment with the plate cylinder or blanket cylinder, respectively, when the inking/coating apparatus 10 is extended to the operative (on-impression) position. Moreover, because the inking/coating apparatus 10 is installed within the dampener space 29, it is capable of freely rotating through a small arc while extending and retracting without being obstructed by the press side frames or other parts of the printing press. This makes it possible to install the inking/coating apparatus 10 on any lithographic printing unit. Moreover, because of its internal mounting position within the dampener space 29, the projection of the inking/coating apparatus 10 into the space between printing units is minimal. This assures unrestricted operator access to the printing unit when the applicator head is in the operative (on-impression) and retracted (off-impression) positions.

As shown in FIG. 4 and FIG. 5, movement of the inking/coating apparatus 10 is counterclockwise from the retracted (off-impression) position to the operative (on-impression) position.

Although the dampener side installation is preferred, the inking/coating apparatus 10 can be adapted for operation on the delivery side of the printing unit, with the inking/coating apparatus being movable from a retracted (off-impression) position to an on-impression position for engagement of the applicator roller with either a plate on the plate cylinder or a blanket on the blanket cylinder on the delivery side 25 of the printing unit.

Movement of the inking/coating apparatus 10 to the operative (on-impression) position is produced by power

actuators, preferably double acting pneumatic cylinders 104, 106 which have extendable/retractable power transfer arms 104A, 106A, respectively. The first pneumatic cylinder 104 is pivotally coupled to the press frame 14 by a pivot pin 108, and the second pneumatic cylinder 106 is pivotally coupled to the press frame 15 by a pivot pin 110. In response to selective actuation of the pneumatic cylinders 104, 106, the power transfer arms 104A, 106A are extended or retracted. The power transfer arm 104A is pivotally coupled to the side support member 74 by a pivot pin 112. Likewise, the power transfer arm 106A is pivotally coupled to the side support member 76 by a pivot pin 114.

As the power arms extend, the inking/coating apparatus 10 is rotated clockwise on the pivot pins 88P, 90P, thus moving the applicator roller 66 to the off-impression position. As the power arms retract, the inking/coater apparatus 60 is rotated counterclockwise on the pivot pins 88P, 90P, thus moving the applicator roller 66 to the on-impression position. The torque applied by the pneumatic actuators is transmitted to the inking/coating apparatus 10 through the pivot pin 112 and pivot pin 114.

Fine adjustment of the on-impression position of the applicator roller relative to the plate cylinder or the blanket cylinder, and of the pressure of roller engagement, is provided by an adjustable stop assembly 115. The adjustable stop assembly 115 has a threaded bolt 116 which is engagable with a bell crank 118.

The bell crank 118 is pivotally coupled to the side support member 74 on a pin 120. One end of the bell crank 118 is engagable by the threaded bolt 116, and a cam roller 122 is mounted for rotation on its opposite end. The striking point of engagement is adjusted by rotation of the bolt 116 so that the applicator roller 66 is properly positioned for inking/coating engagement with the plate P or blanket B and provides the desired amount of inking/coating pressure when the inking/coating assembly 60 is moved to the operative position.

This arrangement permits the in-line inking/coating apparatus to operate effectively without encroaching in the interunit space between any adjacent printing units, and without blocking or obstructing access to the cylinders of the printing units when the inking/coating apparatus is in the extended (off-impression) position or retracted (on-impression) position. Moreover, when the in-line inking/coating apparatus is in the retracted position, the doctor blade reservoir and coating circulation lines can be drained and flushed automatically while the printing press is running as well as when the press has been stopped for change-over from one job to another or from one type of ink or coating to another.

Substrates which are printed or coated with aqueous flexographic printing inks require high velocity hot air for drying. When printing a flexographic ink such as opaque white or metallic gold, it is always necessary to dry the printed substrates between printing units before overprinting them. According to the present invention, the water component on the surface of the freshly printed or coated substrate S is evaporated and dried by high velocity, hot air interunit dryer and high volume heat and moisture extractor units 124, 126 and 128, as shown in FIG. 2, FIG. 4 and FIG. 5. The dryer/extractor units 124, 126 and 128 are oriented to direct high velocity heated air onto the freshly printed/coated substrates as they are transferred by the impression cylinder 36 and the intermediate transfer drum 40 of one printing unit and to another transfer cylinder 30 and to the impression cylinder 36 of the next printing unit. By that

arrangement, the freshly printed flexographic ink or coating material is dried before the substrate S is overprinted by the next printing unit.

The high velocity, hot air dryer and high performance heat and moisture extractor units 124, 126 and 128 utilize high velocity air jets which scrub and break-up the moist air layer which clings to the surface of each freshly printed or coated sheet or web. Within each dryer, high velocity air is heated as it flows across a resistance heating element within an air delivery baffle tube. High velocity jets of hot air are discharged through multiple airflow apertures into an exposure zone Z (FIG. 4 and FIG. 5) and onto the freshly printed/coated sheet S as it is transferred by the impression cylinder 36 and transfer drum 40, respectively.

Each dryer assembly includes a pair of air delivery dryer heads 124D, 126D and 128D which are arranged in spaced, side-by-side relationship. The high velocity, hot air dryer and high performance heat and moisture extractor units 124, 126 and 128 are preferably constructed as disclosed in co-pending U.S. patent application Ser. No. 08/132,584, filed Oct. 6, 1993, entitled "High Velocity Hot Air Dryer", to Howard W. DeMoore, co-inventor and assignee of the present invention, and which is incorporated herein by reference, and which is marketed by Printing Research, Inc. of Dallas, Tex., U.S.A., under its trademark SUPER BLUE HV™.

The hot moisture-laden air displaced from the surface of each printed or coated sheet is extracted from the dryer exposure zone Z and exhausted from the printing unit by the high volume extractors 124, 126 and 128. Each extractor head includes an extractor manifold 124E, 126E and 128E coupled to the dryer heads 124D, 126D and 128D and draws the moisture, volatiles, odors and hot air through a longitudinal air gap G between the dryer heads. Best results are obtained when extraction is performed simultaneously with drying. Preferably, an extractor is closely coupled to the exposure zone Z at each dryer location as shown in FIG. 4. Extractor heads 124E, 126E and 128E are mounted on the dryer heads 124D, 126D and 128D, respectively, with the longitudinal extractor air gap G facing directly into the exposure zone Z. According to this arrangement, each printed or coated sheet is dried before it is printed on the next printing unit.

The aqueous water-based inks used in flexographic printing evaporate at a relatively moderate temperature provided by the interunit high velocity hot air dryers/extractors 124, 126 and 128. Sharpness and print quality are substantially improved since the flexographic ink or coating material is dried before it is overprinted on the next printing unit. Since the freshly printed flexographic ink is dry, dot gain is substantially reduced and back-trapping on the blanket of the next printing unit is virtually eliminated. This interunit drying/extracting arrangement makes it possible to print flexographic inks such as metallic ink and opaque white ink on the first printing unit, and then dry-trap and overprint on the second and subsequent printing units.

Moreover, this arrangement permits the first printing unit 22 to be used as a coater in which a flexographic, aqueous or UV-curable coating material is applied to the lowest grade substrate such as recycled paper, cardboard, plastic and the like, to trap and seal-in lint, dust, spray powder and other debris and provide a smoother, more durable printing surface which can be overprinted on the next printing unit.

A first down (primer) aqueous coating layer seals-in the surface of a low grade, rough substrate, for example, re-cycled paper or plastic, and improves overprinted dot

definition and provides better ink lay-down while preventing strike-through and show-through. A flexographic UV-curable coating material can then be applied downstream over the primer coating, thus producing higher coating gloss.

Preferably, the applicator roller 66 is constructed of composite carbon fiber material, metal or ceramic coated metal when it is used for applying ink or coating material to the blanket B or other resilient material on the blanket cylinder 34. When the applicator roller 66 is applied to the plate, it is preferably constructed as an anilox roller having a resilient, compressible transfer surface. Suitable resilient roller surface materials include Buna N synthetic rubber and EPDM (terpolymer elastomer). EPDM is known to be completely acceptable for use with UV-curable inks and coating applications.

A demonstration resilient anilox roller was made by covering a steel core with about 1/2 inch of rubber to a diameter of about four inches. The rubber had a hardness of about 80 on the Shore A scale. The surface was laser engraved by Consolidated Engravers, 2255 West Longhorn Dr., Lancaster, Tex. 76134 with four different patterns in approximately 10 inch wide bands across the face comprising about 125, 150, 175 and 200 lines/inch with what was a "hexagonal" cell pattern. Satisfactory coatings were applied via the plate cylinder to a substrate with all four patterns. A second resilient anilox roll was obtained which had only one 150 lines/inch overall pattern with a cell volume of about 9 cubic billion microns (CBM). Satisfactory coating was applied from this roll against a plate. Coating was applied to the roll by a sealed doctor blade assembly like assembly 68 in FIG. 6. The roller produced useful film weight. Water based inks were applied satisfactorily in various colors. The surface speed of the plate and resilient anilox rollers were kept about the same. No reason is seen why a roller train similar to fountain assembly 69 in FIG. 8 could not be used to supply coating to a resilient anilox roller 66. The resilient anilox roller will accommodate slight variations in elevation of a printing plate or blanket much better than a ceramic or hard surface anilox roller.

It has been demonstrated in prototype testing that the inking/coating apparatus 10 can apply a wide range of ink and coating types, including fluorescent (Day Glo), pearlescent, metallics (gold, silver and other metals), glitter, scratch and sniff (micro-encapsulated fragrance), scratch and reveal, luminous, pressure-sensitive adhesives and the like, as well as UV-curable and aqueous coatings.

With the dampener assembly removed from the printing unit, the inking/coating apparatus 10 can easily be installed in the dampener space for selectively applying flexographic inks and/or coatings to a flexographic or waterless printing plate or to the blanket. Moreover, overprinting of the flexographic inks and coatings can be performed on the next printing unit since the flexographic inks and/or coatings are dried by the high velocity, hot air interunit dryer and high volume heat and moisture extractor assembly of the present invention or by Ultra Violet curing.

The flexographic inks and coatings as used in the present invention contain colored pigments and/or soluble dyes, binders which fix the pigments onto the surface of the substrate, waxes, defoamers, thickeners and solvents. Aqueous printing inks predominantly contain water as a diluent and/or vehicle. The thickeners which are preferred include alginates, starch, cellulose and its derivatives, for example cellulose esters or cellulose ethers and the like. Coloring agents including organic as well as inorganic pigments may

be derived from dyes which are insoluble in water and solvents. Suitable binders include acrylates and/or polyvinylchloride.

When metallic inks are printed, the cells of the anilox roller must be appropriately sized to prevent the metal particles from getting stuck within the cells. For example, for metallic gold ink, the anilox roller should have a screen line count in the range of 175-300 lines per inch (68-118 lines per cm). Preferably, in order to keep the anilox roller cells clear, the doctor blade assembly 68 is equipped with a bristle brush BR (FIG. 14) as set forth in U.S. Pat. No. 5,425,809 to Steven M. Person, assigned to Howard W. DeMoore, and licensed to Printing Research, Inc. of Dallas, Tex., U.S.A., which is incorporated herein by reference.

The inking/coating apparatus 10 can also apply UV-curable inks and coatings. If UV-curable inks and coatings are utilized, ultra-violet dryers/extractors are installed adjacent to the high velocity hot air dryer/extractor units 124, 126 and 128, respectively.

It will be appreciated that the LITHOFLEX™ printing process described herein makes it possible to selectively operate a printing unit of a press in the lithographic printing mode while simultaneously operating another printing unit of the same press in either the flexographic printing mode or in the waterless printing mode, while also providing the capability to print or coat, separately or simultaneously, from either the plate position or the blanket position. The dual cradle support arrangement of the present invention makes it possible to quickly change over from inking/coating on the blanket cylinder position to inking/coating on the plate cylinder position with minimum press down-time, since it is only necessary to remove and reposition or replace the applicator roller 66 while the inking/coating apparatus 10 is in the retracted position. It is only necessary to remove four cap screws, lift the applicator roller 66 from the cradle, and reposition it in the other cradle. All of this can be accomplished in a few minutes, without removing the inking/coating apparatus 10 from the press.

It is possible to spot coat or overall coat from the plate position or from the blanket position with flexographic inks or coatings on one printing unit and then spot coat or overall coat with UV-curable inks or coatings from the plate position or from the blanket position on another printing unit during the same press run. Moreover, the press operator can spot or overall coat from the plate for one job, and then spot and/or overall coat from the blanket on the next job.

The positioning of the applicator roller relative to the plate or blanket is repeatable to a predetermined preset operative position. Consequently, only minor printing unit modifications or alterations may be required for the LITHOFLEX™ process. Although automatic extension and retraction have been described in connection with the exemplary embodiment, extension to the operative (on-impression) position and retraction to a non-operative (off-impression) position can be carried out manually, if desired. In the manual embodiment, it is necessary to latch the inking/coating apparatus 10 to the press side frames 14, 15 in the operative (on-impression) position, and to mechanically prop the inking/coating apparatus in the off-impression (retracted) position.

Referring again to FIG. 8, an applicator roller 66 is mounted on the lower cradle assembly 100 by side support members 78, 80, and a second applicator roller 66 is mounted on the upper cradle assembly 102 by side support members 82, 84. According to this arrangement, the inking/coating apparatus 10 can apply printing ink and/or coating

material to a plate on the plate cylinder, while simultaneously applying printing ink and/or coating material to a plate or a blanket on the blanket cylinder of the same printing unit. When the same color ink is used by the upper and lower applicator rollers from the plate position and from the blanket position simultaneously on the same printing unit, a "double bump" or double inking films or coating layers are applied to the substrate S during a single pass of the substrate through the printing unit. The tack of the two inks or coating materials must be compatible for good transfer during the double bump. Moreover, the inking/coating apparatus 10 can be used for supplying ink or coating material to the blanket cylinder of a rotary offset web press, or to the blanket of a dedicated coating unit.

According to conventional bronzing techniques, a metallic (bronze) powder is applied off-line to previously printed substrate which produces a grainy, textured finish or appearance. The on-line application of bronze material by conventional flexographic or lithographic printing will only produce a smooth, continuous appearance. However, a grainy, textured finish is preferred for highest quality printing which, prior to the present invention, could only be produced by off-line methods.

Referring now to FIG. 14 and FIG. 15, metallic ink or coating material is applied on-line to the substrate S by simultaneous operation of the upper and lower applicator rollers 67R, 66 to produce an uneven surface finish having a bronze-like textured or grainy appearance. According to the simulated bronzing method of the present invention, the flexographic bronze ink is applied simultaneously to the plate and to the blanket by the dual cradle inking/coating apparatus 10 as shown in FIG. 14. A resilient applicator roller 67R is mounted in the upper cradle 102, and an anilox applicator roller 66 is mounted on the lower cradle 100. The rollers are supplied from separate doctor blade reservoirs 70. The doctor blade reservoir 70 in the upper cradle position supplies bronze ink or coating material having relatively coarse, metallic particles 140 dispersed in aqueous or flexographic ink. The coarse particle ink or coating material is applied to the plate P by the resilient applicator roller 67R in the upper cradle position 102. At the same time, flexographic and/or bronze ink or coating material having relatively fine, metallic particles 142 is transferred to the blanket B by the anilox roller 66 which is mounted on the lower cradle 100.

The metering surfaces of the upper and lower applicator rollers have different cell sizes and volumetric capacities which accommodate the coarse and fine metallic particles. For example, the anilox roller 111 mounted in the upper cradle position 102 which transfers the coarse metallic particles 140 preferably has a screen line count in the range of 100-300 lines per inch (39-118 lines per cm), and the metering surface of the anilox roller 66 mounted on the lower cradle 100 which transfers the relatively fine metallic particles 142 preferably has a screen line count in the range of 200-600 lines per inch (79-236 lines per cm).

After transfer from the plate to the blanket, the fine metallic particles 142 form a layer over the coarse metallic particles 140. As both bronze layers are offset onto the substrate S, the layer of fine metallic particles 142 is printed onto the substrate S with the top layer of coarse metallic particles 140 providing a textured, grainy appearance. The fine metallic particles 142 cover the substrate which would otherwise be visible in the gaps between the coarse metallic particles 140. The combination of the coarse particle layer over the fine particle layer thus provides a textured, bronzed-like finish and appearance.

Particulate materials other than metal can be used for producing a textured finish. For example, coarse and fine particles of metallized plastic (glitter), mica particles (pearlescent) and the like, can be substituted for the metallic particles for producing unlimited surface variations, appearances and effects. All of the particulate material, including the metallic particles, are preferably in solid, flat platelet form, and have a size dimension suitable for application by an anilox applicator roller. Other particulate or granular material, for example stone grit having irregular form and size, can be used to good advantage.

Solid metal particles in platelet form, which are good reflectors of light, are preferred for producing the bronzed-like appearance and effect. However, various textured finishes, which could have light-reflective properties, can be produced by using granular materials such as stone grit. Most commonly used metals include copper, zinc and aluminum. Other ductile metals can be used, if desired. Moreover, the coarse and fine particles need not be made of the same particulate material. Various effects and textured appearances can be produced by utilizing diverse particulate materials for the coarse particles and the fine particles, respectively. Further, either fine or coarse particle ink or coating material can be printed from the upper cradle position, and either fine or coarse particle ink or coating material can be printed from the lower cradle position, depending on the special or surface finish that is desired.

It will be appreciated that the last printing unit 28 can be configured for additional inking/coating capabilities which include lithographic, waterless, aqueous and flexographic processes. Various substrate surface effects (for example double bump or triple bump inking/coating or bronzing) can be performed on the last printing unit. For triple bump inking/coating, the last printing unit 28 is equipped with an auxiliary in-line inking or coating apparatus 97 as shown in FIG. 3 and FIG. 4. The in-line inking or coating apparatus 97 allows the application of yet another film of ink or a protective or decorative layer of coating material over any freshly printed or coated surface effects or special treatments, thereby producing a triple bump. The triple bump is achieved by applying a third film of ink or layer of coating material over the freshly printed or coated double bump simultaneously while the substrate is on the impression cylinder of the last printing unit.

When the in-line inking/coating apparatus 97 is installed, it is necessary to remove the SUPER BLUE® flexible covering from the delivery cylinder 42, and it is also necessary to modify or convert the delivery cylinder 42 for inking/coating service by mounting a plate or blanket B on the delivery cylinder 42, as shown in FIG. 3 and FIG. 4. Packing material is placed under the plate or blanket B, thereby packing the plate or blanket B at the correct packed-to-print radial clearance so that ink or coating material will be printed or coated onto the freshly printed substrate S as it transfers through the nip between the plate or blanket B on the converted delivery cylinder 42 and the last impression cylinder 36. According to this arrangement, a freshly printed or coated substrate is overprinted or overcoated with a third film or layer of ink or coating material simultaneously while a second film or layer of ink or coating material is being overprinted or overcoated on the last impression cylinder 36.

The auxiliary inking/coating apparatus 97 and the converted or modified delivery cylinder 42 are mounted on the delivery drive shaft 43. The inking/coating apparatus 97 includes an applicator roller, preferably an anilox applicator roller 97A, for supplying ink or coating material to a plate

or blanket B on the modified or converted delivery cylinder 42. The in-line inking/coating apparatus 97 and the modified or converted delivery cylinder 42 are preferably constructed as described in U.S. Pat. No. 5,176,077 to Howard W. DeMoore (co-inventor and assignee), which is hereby incorporated by reference. The in-line inking/coating apparatus 97 is manufactured and sold by Printing Research, Inc. of Dallas, Tex., U.S.A., under its trademark SUPER BLUE EZ COATER.™

After the delivery cylinder 42 has been modified or converted for inking/coating service, and because of the reduced nip clearance imposed by the plate or blanket B, the modified delivery cylinder 42 can no longer perform its original function of guiding and transferring the freshly printed or coated substrate. Instead, the modified or converted delivery cylinder 42 functions as a part of the inking/coating apparatus 97 by printing or coating a third down film of ink or layer of coating material onto the freshly printed or coated substrate as it is simultaneously printed or coated on the last impression cylinder 36. Moreover, the mutual tack between the second down ink film or coating layer and the third down ink film or coating layer causes the overprinted or overcoated substrate to cling to the plate or blanket, thus opposing or resisting separation of the substrate from the plate or blanket.

To remedy this problem, a vacuum-assisted transfer apparatus 99 is mounted adjacent the modified or converted delivery cylinder 42 as shown in FIG. 3 and FIG. 4. Another purpose of the vacuum-assisted transfer apparatus 99 is to separate the freshly overprinted or overcoated triple bump substrate from the plate or blanket B as the substrate transfers through the nip. The vacuum-assisted transfer apparatus 99 produces a pressure differential across the freshly overprinted or overcoated substrate as it transfers through the nip, thus producing a separation force onto the substrate and providing a clean separation from the plate or blanket B.

The vacuum-assisted transfer apparatus 99 is preferably constructed as described in U.S. Pat. Nos. 5,113,255; 5,127,329; 5,205,217; 5,228,391; 5,243,909; and 5,419,254, all to Howard W. DeMoore, co-inventor, which are incorporated herein by reference. The vacuum-assisted transfer apparatus 99 is manufactured and sold by Printing Research, Inc. of Dallas, Tex., U.S.A. under its trademark BACVAC.™

Although the present invention and its advantages have been described in detail, it should be understood that various changes, substitutions and alterations can be made herein without departing from the spirit and scope of the present invention as defined by the appended claims.

What is claimed is:

1. In a rotary offset printing press having first and second side frame members and a plurality of printing units each having a plate cylinder, a blanket cylinder, and an impression cylinder supported for rotation in operable combination, the printing units having a delivery side and a dampener side opposite the delivery side, an interunit operator space between printing units and a dampener or a space for a dampener on the dampener side of each unit, the improvement comprising:

a printing apparatus for inking or coating, the printing apparatus having a frame movably coupled to at least one printing unit in the space for a dampener, the printing apparatus being movable between an on-impression operative position and an off-impression retracted position;

the movable frame supporting a removable first applicator roller and a removable second applicator roller, the first

applicator roller, being supported for adjustment into and out of ink or coating association with the plate cylinder and the second applicator roll being supported for adjustment into and out of ink or coating association with the blanket cylinder, when the printing apparatus is moved respectively to the on-impression operative position and the off-impression retracted position; whereby a continuous or spot film of ink or coating can be applied simultaneously by the printing apparatus to a plate on the plate cylinder and the blanket cylinder and ink or coating can be selectively applied to the plate cylinder or blanket cylinder or a plate mounted thereon if one of the first or second applicator rollers is removed from the frame.

2. The invention as set forth in claim 1 wherein the printing apparatus includes:

a doctor blade assembly having a reservoir for receiving ink or coating material coupled to the first or second applicator roll.

3. The invention as set forth in claim 2, the applicator roller comprising:

a roller having a resilient transfer surface.

4. The invention as set forth in claim 1, including:

first and second pivot pins mounted on the first and second side frame members, respectively, said pivot pins extending in alignment with the rotational axis of the plate and blanket cylinders; and

the printing apparatus being pivotally coupled for rotational movement on the pivot pins.

5. The invention as set forth in claim 1, further comprising:

a power actuator pivotally coupled to the printing unit, the power actuator having a power transfer arm which is extendable and retractable; and,

apparatus coupled to the power transfer arm and to the printing apparatus for converting extension or retraction movement of the power transfer arm into pivotal movement of the printing apparatus relative to the plate and blanket cylinder.

6. The invention as set forth in claim 5, in which the movement converting apparatus comprises:

a bell crank plate having a first end portion pivotally coupled to the printing apparatus for engaging the printing unit and having a second end portion for engaging a stop member; and,

a stop member coupled to the inking or coating apparatus for engaging the second end portion of the bell crank plate.

7. The invention as set forth in claim 1, the printing apparatus comprising:

the movable frame having first and second side support members;

the ink or coating applicator rollers being mounted between the first side support member and second side support member and having a reservoir or fountain pan for receiving ink or coating material;

cradle means mounted on the first and second side support members, respectively for removably supporting the first and second applicator rollers in the movable frame;

power transfer means coupled to the applicator rollers for rotation thereof.

8. The invention as set forth in claim 7,

the cradle means including a first cradle assembly disposed on the first and second side support members, respectively, and a second cradle assembly disposed on the first and second side support members, respectively;

the first applicator roller is mounted for rotation on the first cradle assembly; and

the second applicator roller is mounted for rotation on the second cradle assembly.

9. The invention as set forth in claim 1 wherein a container means for containing liquid ink or coating material and means for applying ink or coating material from the container means to a peripheral surface portion of the first and second applicator rolls is provided and supported by the printing apparatus.

10. The invention as set forth in claim 9 wherein the container means comprises a doctor blade assembly having a reservoir or fountain pan for supplying ink or coating material to each of said applicator rollers, and having a doctor blade disposed for wiping engagement with each of said applicator rollers when it is received in rolling contact with ink or coating material in the reservoir or pan.

11. The invention as set forth in claim 9, wherein the container means comprises a fountain pan and the inking applying means comprises a pan for transferring ink or coating material from the fountain pan to said first and second applicator rollers.

12. A rotary offset printing press having a printing unit of the type having a delivery side and a dampener side, said dampener side having a dampener space for receiving a dampener, comprising, in combination:

a plate cylinder mounted on the printing unit between the delivery side and the dampener side, and a printing plate mounted on the plate cylinder;

a blanket cylinder having an ink or coating receptive blanket disposed in ink or coating transfer engagement with the plate for transferring ink or coating material from the image surface areas of the printing plate to the ink or coating receptive blanket;

an impression cylinder disposed adjacent the blanket cylinder thereby forming a nip between the blanket and the impression cylinder whereby the printing ink or coating material is transferred from the blanket to a substrate as the substrate is transferred through the nip;

support means mounted on the dampener side of the printing unit;

an inking or coating apparatus having a removable first applicator roller and a removable second applicator roller, being positioned in the dampener space in place of a dampener, the inking or coating apparatus being coupled to the support means for movement between an on-impression operative position and an off-impression retracted position wherein the first applicator roller is adjustably supported for movement into and out of ink or coating association with the plate on the plate cylinder while the second applicator roller is adjustably supported for simultaneous movement into and out of ink or coating association with the blanket on the blanket cylinder; and

whereby a continuous or spot film of ink or coating can be applied by the inking and coating apparatus to a plate on the plate cylinder and a blanket on the blanket cylinder and ink or coating can be selectively applied to the plate on the plate cylinder or the blanket cylinder blanket or a plate thereon.

13. The invention as defined in claim 12 wherein the plate cylinder, blanket cylinder, impression cylinder and inking or coating apparatus forms a first printing unit, the printing press having a second printing unit for printing or coating the substrate subsequently to the first printing unit, the printing press further including:

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a dryer mounted on the printing press for discharging heated air onto a freshly printed or coated substrate from the first printing unit before the freshly printed or coated substrate is subsequently printed, coated or otherwise processed in the second printing unit.

14. The invention as defined in claim 13 wherein:

the dryer is mounted adjacent to the impression cylinder for discharging heated air onto a freshly printed or coated substrate while the substrate is in contact with the impression cylinder.

15. The invention as defined in claim 13 comprising:

an extractor coupled to the dryer for extracting hot air, moisture, odors and volatiles from an exposure zone between the dryer and the freshly printed or coated substrate.

16. The invention as defined in claim 12 wherein the printing press has an interunit position, comprising:

a transfer cylinder disposed in the interunit position on the press and coupled in sheet transfer relation with the impression cylinder; and

an interunit dryer disposed adjacent the transfer cylinder for discharging heated air onto a freshly printed or coated substrate after it has been transferred from the impression cylinder and while it is in contact with the transfer cylinder.

17. A printing press as defined in claim 12 wherein the plate cylinder, blanket cylinder, impression cylinder, support means and inking or coating apparatus form a first printing unit, the printing press having a second printing unit including a plate cylinder, a blanket cylinder and an impression cylinder in operable combination, further including:

a transfer drum coupled in substrate transfer relation with the impression cylinder of the first printing unit and in substrate transfer relation with the impression cylinder of the second printing unit;

a first dryer mounted adjacent the impression cylinder of the first printing unit for discharging heated air onto a freshly printed or coated substrate while the substrate is in contact with the impression cylinder of the first printing unit;

a second dryer mounted adjacent the transfer drum for discharging heated air onto a freshly printed or coated substrate after it has been transferred from the impression cylinder of the first printing unit and while it is in contact with the transfer cylinder; and,

a third dryer disposed adjacent the impression cylinder of the second printing unit for discharging heated air onto a freshly printed or coated substrate after it has been transferred from the transfer drum and while it is in contact with the impression cylinder of the second printing unit.

18. The invention as defined in claim 12 wherein the inking or coating apparatus includes:

first cradle means for supporting the first applicator roller for engagement with the plate when the inking or coating apparatus is in the operative position; and,

second cradle means for supporting the second applicator roller for engagement with the blanket when the inking or coating apparatus is in the operative position.

19. The invention as defined in claim 12, said support means comprising:

first and second pivot means mounted on the first and second side frame members, respectively.

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20. The invention as defined in claim 12, further comprising:

a power actuator pivotally coupled to the inking or coating apparatus, the power actuator having a power transfer arm which is selectively extendable or retractable; and,

apparatus coupled to the power transfer arm and to the inking or coating apparatus for converting extension or retraction movement of the power transfer arm into pivotal movement of the inking or coating apparatus relative to the printing unit.

21. The invention as defined in claim 12 further comprising:

a bell crank plate having a first end portion coupled to the inking or coating apparatus and having a second end portion for engaging a stop member; and,

a stop member secured to the inking or coating apparatus for engaging the second end portion of the bell crank plate.

22. The invention as defined in claim 1 or 12 wherein the inking or coating apparatus comprises:

the first applicator roller having a resilient transfer surface.

23. A printing press as defined in any one of claims 1 or 12 including:

a supply container for containing a volume of liquid ink or coating material;

circulation means coupled between the supply container and the inking or coating apparatus for inducing the flow of liquid ink or coating material from said supply container to the inking or coating apparatus and for returning liquid ink or coating material from the inking or coating apparatus to the supply container; and,

heat exchanger means coupled to the circulation means for maintaining the temperature of the liquid ink or coating material within a predetermined temperature range.

24. A printing press as defined in any one of the claims 1 or 12 wherein the inking or coating apparatus comprises:

a fountain pan for containing a volume of liquid ink or coating material;

an applicator roller having a metering surface; and,

a pan roller mounted for rotation in the fountain pan and coupled to the applicator roller for transferring ink or coating material from the fountain pan to the applicator roller.

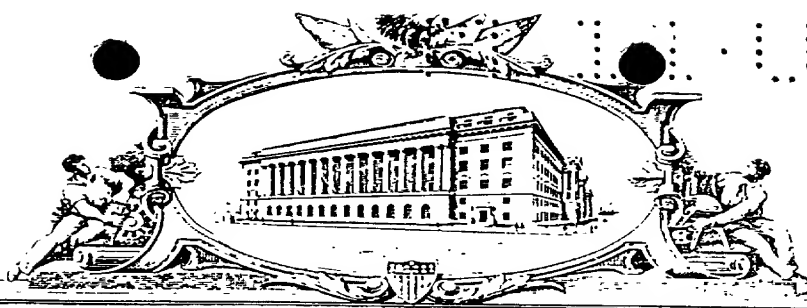
25. A printing press as defined in any one of claims 1 or 12 characterized in that:

a resilient packing is mounted on the blanket cylinder, and

a printing plate is mounted on the resilient packing.

26. A printing press as defined in any one of claims 1 or 12 further including means for applying ink or coating material to the first and second applicator rollers, and the inking or coating apparatus is pivotally mounted on the printing unit in a position in which the nip contact point between the applicator rollers and the blanket and plate cylinders is offset with respect to a radius line projecting through the center of the plate cylinder and blanket cylinder to the axis of pivotal motion of the inking or coating apparatus.

* * * * *



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APPLICATION NUMBER: 08/435,798 ✓

FILING DATE: May 4, 1995 ✓



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08 435798

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FEE RECORD SHEET

00315740 161801

110 MM 05/19/93 08435798

1 201 633.00 CK B6012

PTO-1556
(5/87)

"RETRACTABLE INKING/COATING APPARATUS
HAVING FERRIS MOVEMENT BETWEEN PRINTING UNITS"

Abstract of the Disclosure

1 A retractable in-line inking/coating apparatus selec-
2 tively applies either spot or overall ink/coating to a blanket or
3 flexographic plate on a blanket cylinder or spot coating or
4 overall ink/coating to a flexographic printing plate on a plate
5 cylinder in a rotary offset printing press. The inking/coating
6 apparatus is pivotally mounted on the tower of a printing unit or
7 dedicated coating unit, and is extended into and retracted out of
8 inking/coating engagement by a carriage assembly which is
9 pivotally coupled to the printing unit tower. Because of the
10 pivotal support provided by a cantilevered support arm, the
11 inking/coating apparatus can be raised and lowered through a
12 Ferris wheel arc movement between adjacent printing units. The
13 aqueous component of the printing ink or coating is evaporated by
14 a high velocity, hot air interstation dryer and a high performance
15 heat and moisture extractor so that the ink on a freshly printed
16 sheet is dry before the sheet is printed on the next printing
17 unit. Thus, flexographic ink or coating applied at the first
18 printing unit can immediately be overprinted on subsequent
19 printing units.

* * * * *

DTG11879014800C000012 APP

SPECIFICATION

accompanying

Application for Grant of U.S. Letters Patent

JOINT

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TITLE: "RETRACTABLE INKING/COATING APPARATUS HAVING FERRIS
MOVEMENT BETWEEN PRINTING UNITS"

Field of the Invention

1 This invention relates to sheet-fed or web-fed, rotary
2 offset or flexographic printing presses, and more particularly, to
3 a new and improved inking/coating apparatus for the in-line
4 application of printing inks or protective or decorative coatings
5 to sheets or web.

6 Background of the Invention

7 Conventional sheet-fed, rotary offset printing presses
8 typically include one or more printing units through which
9 individual sheets are fed and printed with wet ink. After the
10 last printing unit, the sheets are transferred by a delivery
11 conveyor to the delivery end of the press where the freshly
12 printed sheets are collected and stacked. In a typical sheet-fed,
13 rotary offset printing press such as the Heidelberg Speedmaster
14 line of presses, the delivery conveyor includes a pair of endless
15 gripper chains carrying gripper bars and gripper fingers which
16 grip and pull freshly printed sheets from the last impression
17 cylinder and convey the sheets to the sheet delivery stacker.

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1 Since the inks used with rotary offset printing presses
2 typically remain wet and tacky for some time after printing,
3 special precautions must be taken to insure that the freshly
4 printed sheets are not marked or smeared as the sheets are
5 transferred from one printing unit to another, and while being
6 conveyed to the sheet delivery stacker. The printed surface of
7 the sheet dries relatively slowly and can be smeared during
8 subsequent transfer between printing units. In order to reduce
9 smearing and offsetting, spray powder is applied on the printed
10 sheet.

11 In some printing applications, offset and smearing are
12 prevented by applying a protective and/or decorative coating over
13 all or a portion of the freshly printed sheets. Some coating
14 solutions include varnish, lacquer, dye, moisturizers and ink.
15 Such coatings are formed of a UV-curable or water-dispersed resin
16 applied as a liquid solution or emulsion over the freshly printed
17 sheets to protect the ink and improve the appearance of the
18 freshly printed sheets. Such coatings are particularly desirable
19 when decorative or protective finishes are required such as in the
20 production of posters, record jackets, brochures, magazines,
21 folding cartons and the like. The coating is permeable to oxygen
22 to permit drying of the ink. In cases where a liquid coating is
23 to be applied, the coating operation is carried out after the last
24 color ink has been printed. In some cases, it is desirable to
25 spot coat from the printing plate. For both operations, the
26 coating is most desirably performed by an in-line coater.

27 In printing presses having flexographic printing plates,
28 an aqueous ink is used, for example metallic (gold) ink and opaque
29 white ink, both of which can be overprinted at the next printing
30 unit. An advantage of flexographic printing is that no dampening
31 unit is required. The flexographic printing plate has a raised
32 image surface (relief). Colors are stronger when flexographic
33 inks are used because they are not diluted by dampening solution.

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1 Description of the Prior Art

2 Various arrangements have been made for applying the
3 coating as an in-line printing operation by using the last
4 printing unit of the press as the coating application unit. For
5 example, in U.S. Patents 4,270,483, 4,685,414 and 4,779,557, there
6 are disclosed coating apparatus which can be moved into position
7 to allow the blanket cylinder of the last printing unit of a press
8 to be used to apply a coating material to the sheets. In U.S.
9 Patent 4,796,556 and U.S. Patent 4,841,903 there is disclosed a
10 coating apparatus which can be selectively moved between the
11 blanket cylinder or the plate cylinder of the last printing unit
12 of the press so that the last printing unit can only be used for
13 coating purposes. However, when coating apparatus of these types
14 are used, the last printing unit cannot be used to apply ink to
15 the sheets, but rather can only be used for the coating operation.
16 Thus, while coating with these types of in-line coating apparatus,
17 the press loses the capability of printing its full range of
18 colors since the last printing unit is converted to a coating
19 unit.

20 Proposals for overcoming the problem of the loss of a
21 printing unit when in-line coating is desired have also been made,
22 such as that set forth in U.S. Patent 4,934,305 which discloses a
23 coating apparatus having a separately timed applicator roller
24 positioned to apply the coating material to the freshly printed
25 sheet while the sheet is on the last impression cylinder of the
26 press. This is said to allow the last printing unit to print and
27 coat simultaneously, so that no loss of a printing unit capability
28 results. Another approach to providing a coating unit without
29 losing the printing capabilities of the last printing unit is to
30 provide a totally separate coating unit downstream of the last
31 printing unit so that the coating is applied to the sheets after
32 the last printing unit. Such an arrangement is disclosed in U.S.
33 Patents 4,399,767, 4,706,601 and 5,176,077.

34 In an effort to reduce costs and maintain flexibility in
35 adapting the printing press to different jobs, coating apparatus

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1 has been provided that can be selectively engaged with the plate
2 cylinder or blanket cylinder to carry out the coating operation
3 and disengaged so that the last printing unit can be used for
4 offset printing when coating is not required. Examples of coater
5 which are selectively engagable with either the plate cylinder or
6 the blanket cylinder are disclosed in U.S. Patent 4,615,293
7 (Jahn), U.S. Patent 5,107,790 (Sliker et al.) and U.S. Patent
8 4,841,903 (Bird).

9 The coater of U.S. Patent 4,615,293 includes two
10 applicator rollers, both disposed on the dampening side of the
11 plate cylinder and blanket cylinder for carrying out spot and
12 blanket coating operations as desired. The coater of U.S. Patent
13 5,107,790 is retractable along an inclined rail for extending and
14 retracting a coater head into engagement with either the plate
15 cylinder or the blanket cylinder. Because of its size, the
16 rail-retractable coater can only be installed between the last
17 printing unit of the press and the delivery stacker, and cannot be
18 used at interstation positions. The coaters of Patent 4,615,293
19 are located on the dampener side of the plate and blanket cylinders
20 and, thus requiring removal of the dampening unit to make room
21 for the doctor blade head and applicator rollers. Consequently
22 the last printing unit of the press is converted into a coating
23 unit, resulting in the loss of the printing capability of the
24 printing unit.

25 It will be appreciated that the time required to
26 reconfigure a press for coating or non-coating is non-productive
27 and costly. Accordingly, there is a need for a coating apparatus
28 which minimizes the time to clean-up from one printing run and set
29 up and run the next job. Where consecutive jobs require the same
30 type of coating, particularly blanket coating, it may not be
31 necessary to clean-up the coater between jobs. However, the
32 coating cannot be allowed to dry on the rollers. Therefore
33 especially when switching from blanket to spot coating or vice
34 versa, or if there is a delay between jobs, it is necessary to
35 wash-up the coater after each job is completed.

1 In addition, wash-up is necessary when switching between
2 different coating compositions, such as aqueous and ultra-violet
3 (UV) curable coatings. Such coatings are not interchangeable, and
4 the coaters must be washed between applications of the different
5 coating media. It is difficult to wash-up some coaters while the
6 press is running. Moreover, the retractable coaters mentioned
7 above occupy a large amount of press space and diminishes
8 accessibility to the press. Elaborate equipment is needed for
9 retracting the coater from the operative coating position to an
10 out-of-the-way, inoperative position which reduces access to the
11 printing unit.

12 A limitation on the use of flexographic printing plates
13 and aqueous printing inks is that the freshly printed or coated
14 sheets require hot air for drying. When applying an aqueous ink
15 such as opaque white or metallic gold, it is necessary to dry the
16 printed sheets between printing units before overprinting them.

17 Moreover, when utilizing lithographic printing inks, it
18 is necessary to frequently stop the press and wash the blanket.
19 Metallic ink in particular "piles" on the blanket and must be
20 washed frequently.

21 Objects of the Invention

22 Accordingly, the principal object of the present
23 invention is to provide improved inking/coating apparatus which is
24 capable of selectively applying ink or a coating material to a
25 plate on a plate cylinder or a coating material to a blanket on a
26 blanket cylinder of a printing press.

27 Another object of the present invention is to provide
28 inking/coating apparatus of the character described which is
29 extendable into inking/coating engagement with either a plate
30 cylinder or a blanket cylinder, and which is retractable to a non-
31 operative position to provide clear access to the cylinders of the
32 printing unit.

33 A related object of the present invention is to provide
34 inking/coating apparatus of the character described which is

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1 capable of being used in an interstation position and does not
2 interfere with access to the press.

3 Yet another object of the present invention is to
4 provide inking/coating apparatus of the character described, which
5 can be moved from an operative inking/coating engagement position
6 to a non-operative, retracted position.

7 Still another object of the present invention is to
8 provide inking/coating apparatus of the character described, which
9 can be used for applying aqueous inks and coatings to a litho-
10 graphic printing plate or a flexographic printing plate in a
11 rotary offset press.

12 A related object of the present invention is to provide
13 inking/coating apparatus of the character described, which is
14 capable of applying aqueous coating at one printing unit and
15 drying the coating before it reaches the next printing unit where
16 it can be overprinted with aqueous ink or lithographic ink.

17 Another object of the present invention is to provide
18 inking/coating apparatus for use on a multiple color rotary offset
19 printing press that can apply ink or coating to the plate or
20 blanket of a printing unit from a single applicator head.

21 A related object of the invention is to provide
22 inking/coating apparatus of the character described, in which no
23 printing unit adjustment or alteration is required when the
24 applicator head is converted from plate to blanket operation and
25 vice versa.

26 Summary of the Invention

27 The foregoing objects are achieved by a retractable, in-
28 line inking/coating apparatus which is mounted on a printing unit
29 tower for pivotal, Ferris wheel type movement between an operative
30 inking/coating position and a retracted, overhead position. The
31 inking/coating apparatus includes an applicator head which extends
32 into and retracts out of engagement with a plate on a plate
33 cylinder or a blanket on a blanket cylinder. The inking/coating
34 applicator head is positioned in parallel alignment with either

1 the plate cylinder or the blanket cylinder by a carriage assembly
2 which includes a cantilever support arm. The support arm is
3 pivotally coupled between the inking/coating head and the printing
4 unit tower. This cantilevered, pivotal mounting arrangement
5 allows the inking/coating unit to be used between two printing
6 units, as well as installed on the last printing unit of the
7 press.

8 In the preferred embodiment, the applicator head
9 includes vertically spaced pairs of cradle members with one cradle
10 pair being adapted for supporting a metal or ceramic coating
11 roller in alignment with a blanket cylinder, and the other cradle
12 pair supporting a resilient anilox coating roller in alignment
13 with the plate cylinder, respectively, when the applicator head is
14 in the operative position. Because of the cantilevered, pivotal
15 support provided by the support arm, the applicator head can be
16 lifted and lowered through an arc, similar to Ferris wheel
17 movement, in the limited space between adjacent printing units.
18 When fully retracted, the coater and carriage assembly are lifted
19 to an overhead position overlying the printing unit tower, thus
20 providing complete access to the printing unit cylinders, without
21 causing the printing unit to lose its printing capability. The
22 inking/coating applicator roller can be inspected, cleaned or
23 replaced and the doctor blade assembly can be washed-up automati-
24 cally while the inking/coating apparatus is in the fully retracted
25 position.

26 When the inking/coating apparatus is used in combination
27 with a flexographic printing plate and aqueous ink or aqueous
28 coating, the water component of the aqueous ink or coating on the
29 freshly printed sheet is evaporated by a high velocity, hot air
30 interstation dryer and a high volume heat and moisture extractor
31 assembly so that the freshly printed ink or coating is completely
32 dry before the sheet is printed on the next printing unit. This
33 quick drying flexographic printing/coating arrangement permits a
34 base coat of ink, for example opaque white or metallic ink (gold,
35 silver or other metallics) to be applied in the first printing

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1 unit, and then overprinted by the lithographic process on the next
2 printing unit.

3 Other features and advantages of the present invention
4 will become more apparent from the following detailed description
5 taken in conjunction with the accompanying drawings which
6 disclose, by way of example, the principles of the present
7 invention.

8 Brief Description of the Drawings

9 FIGURE 1 is a schematic side elevational view of a
10 sheet-fed, rotary offset printing press having inking/coating
11 apparatus embodying the present invention;

12 FIGURE 2 is a perspective view of the printing press of
13 FIGURE 1 in which a dual head inking/coating apparatus is in the
14 operative coating position and a single head coater is in a
15 retracted, overhead position;

16 FIGURE 3 is an enlarged simplified perspective view
17 showing one side of the single head inking/coating apparatus of
18 FIGURE 1 in the operative position;

19 FIGURE 4 is a simplified side elevational view showing
20 the dual head inking/coating apparatus in the operative coating
21 position for spot or overall coating from the blanket position;

22 FIGURE 5 is a simplified side elevational view showing
23 the single head inking/coating apparatus in the operative coating
24 position for spot or overall coating from the plate position; and,

25 FIGURE 6 is a simplified side elevational view of the
26 dual head inking/coating apparatus of FIGURE 4, partially broken
27 away, which illustrates the hydraulic drive assembly and doctor
28 blade assembly.

29 Detailed Description of the Preferred Embodiments

30 As used herein, the term "processed" refers to various
31 printing methods which may be applied to either side of a
32 substrate, including the application of UV-curable and aqueous
33 inks and/or coatings. The term "substrate" refers to sheet or web

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1 material. Also, as used herein, the term "waterless printing
2 plate" refers to a printing plate having non-image surface areas
3 which are hydrophobic and also having image surface areas which
4 are hydrophilic, wherein the non-image surface areas are charac-
5 terized by a surface tension value which is less than the surface
6 tension of aqueous ink, and the image surface areas are character-
7 ized by a surface tension value which is greater than the surface
8 tension of aqueous ink. "Flexographic" refers to flexible
9 printing plates having a relief surface which is wettable by
10 aqueous ink or coating material.

11 As shown in the exemplary drawings, the present
12 invention is embodied in a new and improved in-line inking/coating
13 apparatus, herein generally designated 10, for use in applying
14 inks or protective and/or decorative coatings to sheets or web
15 printed in a sheet-fed or web-fed, offset rotary or flexographic
16 printing press, herein generally designated 12. In this instance
17 as shown in FIGURE 1, the inking/coating apparatus 10 is installed
18 in a four color printing press 12, such as that manufactured by
19 Heidelberger Druckmaschinen AG of the Federal Republic of Germany
20 under its designation Heidelberg Speedmaster 102V (40"). The
21 press 12 includes a press frame 14 coupled at one end, herein the
22 right end, to a sheet feeder 16 from which sheets, herein
23 designated S, are individually and sequentially fed into the
24 press, and at the opposite end, with a sheet delivery stacker 20
25 in which the freshly printed sheets are collected and stacked.
26 Interposed between the sheet feeder 16 and the sheet delivery
27 stacker 20 are four substantially identical sheet printing units
28 22, 24, 26 and 28 which can print different color inks onto the
29 sheets as they are transferred through the press 12. The printing
30 units are housed within printing towers T1, T2, T3 and T4 formed
31 by side frame members 14, 15.

32 As illustrated, the printing units 22, 24, 26 and 28 are
33 substantially identical and of conventional design. The first
34 printing unit 22 includes an in-feed transfer cylinder 30, a plate
35 cylinder 32, a blanker cylinder 34 and an impression cylinder 36.

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1 all supported for rotation in parallel alignment between the press
2 side frames 14, 15 which define printing unit towers T1, T2, T3
3 and T4. Each of the first three printing units 22, 24 and 26 have
4 a transfer cylinder 38 disposed to withdraw the freshly printed
5 sheets from the adjacent impression cylinder and transfer the
6 freshly printed sheets to the next printing unit via an inter-
7 station transfer cylinder 40. The last printing unit 28 is shown
8 equipped with a delivery cylinder 42 which supports the printed
9 sheet 18 as it is transferred from the last impression cylinder 36
10 to a delivery conveyor system, generally designated 44, to the
11 sheet delivery stacker 20.

12 The delivery conveyor system 44 as shown in FIGURE 2 is
13 of conventional design and includes a pair of endless delivery
14 gripper chains 46, only one of which is shown carrying at regular
15 spaced locations along the chains, laterally disposed gripper bars
16 having gripper fingers used to grip the leading edge of a freshly
17 printed sheet 18 after it leaves the nip between the delivery
18 cylinder 42 and impression cylinder 36 of the last printing unit
19 28. As the leading edge is gripped by the grippers, the delivery
20 chains 46 pull the sheet away from the impression cylinder 36 and
21 convey the freshly printed sheet to the sheet delivery stacker 20.

22 Prior to reaching the delivery sheet stacker, the
23 freshly printed and/or coated sheets 8 pass under a delivery dryer
24 48 which includes a combination of infra-red thermal radiation,
25 high velocity hot air flow and a high performance heat and
26 moisture extractor for drying the ink and/or the protec-
27 tive/decorative coating.

28 In the exemplary embodiment shown in FIGURE 1, the first
29 printing unit 22 is equipped with a flexographic printing plate,
30 and does not require an inking roller train or a dampening system.
31 If an ink roller train is mounted on the first printing unit, the
32 form rollers are retracted and locked off when the printing unit
33 goes on impression. Flexographic aqueous ink is supplied by the
34 inking/coating unit 110. The remaining printing units 24, 26 and
35 28 are equipped for lithographic printing and include an inking

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1 apparatus 50 having an inking roller train 52 arranged to transfer
2 ink from an ink fountain 54 to the plate cylinder 32. This is
3 accomplished with the aid of a fountain roller 56 and a ductor
4 roller. The fountain roller 56 projects into the ink fountain 54,
5 whereupon its surface is wetted with ink. The printing ink Q is
6 transferred intermittently to the inking roller train 52 by the
7 ductor roller. The inking roller train 52 supplies ink Q to the
8 image area of a printing plate P mounted on the plate cylinder 32.

9 The printing ink Q is transferred from the printing
10 plate P to an ink receptive blanket B which is mounted on the
11 blanket cylinder 34. The inked image carried on the blanket B is
12 transferred to a sheet S as the sheet is transferred through the
13 nip between the impression cylinder 36 and the blanket B.

14 The inking roller arrangement 52 illustrated in FIGURE
15 1 is exemplary for use in combination with lithographic ink
16 printing plates. It will be understood that dampening rollers
17 (not illustrated) will be in direct engagement with the litho-
18 graphic plate P, but are not used in combination with the
19 flexographic plate of printing unit 22.

20 Referring now to FIGURE 4, FIGURE 5 and FIGURE 6, the
21 in-line inking/coating apparatus 10 includes a carriage assembly
22 58 which supports an applicator head 60. The applicator head 60
23 includes a hydraulic motor 62, a lower gear train 64, an upper
24 gear train 65, an applicator roller 66 and a doctor blade assembly
25 68. The external peripheral surface of the applicator roller 66
26 is inserted into wetting contact with liquid coating material or
27 ink contained in a reservoir 70. The reservoir is continuously
28 supplied with ink or coating which is circulated through the
29 reservoir 70 from an off-press source by a pump (not illustrated).
30 The hydraulic motor 62 drives the applicator roller 66 synchro-
31 nously with the plate cylinder 32 and the blanket cylinder 34 in
32 response to an RPM control signal from the press drive (not
33 illustrated) and a feedback signal developed by a tachometer 72.
34 While a hydraulic drive motor is preferred, an electric drive
35 motor can be used.

1 The fluid metering applicator 66 is preferably an anilox
2 roller which transfers measured amounts of printing ink or coating
3 material onto the printing plate or blanket. The surface of an
4 anilox roller is engraved with an array of closely spaced, shallow
5 depressions referred as "cells". Ink or coating from the
6 reservoir 70 flows into the cells as the anilox roller turns
7 through the reservoir. The transfer surface of the anilox roller
8 is scraped with a doctor blade 73 to remove excess ink or coating.
9 The ink or coating remaining on the anilox roller is that
10 contained within the cells.

11 The anilox roller 66 is cylindrical and may be con-
12 structed in various diameters and lengths, containing cells of
13 various sizes and shapes. The volumetric capacity of an anilox
14 roller is established during manufacturing and is dependent upon
15 the selection of cell size, shape and number of cells per unit
16 area. Depending upon the intended application, the cell pattern
17 may be fine (many small cells per square inch) or coarse (fewer
18 larger cells per square inch).

19 By applying the ink or coating through the inking/coat-
20 ing applicator 60, more ink or coating can be delivered to the
21 sheet 8 as compared with the inking roller train of a lithographic
22 printing unit. Moreover, color intensity is stronger and more
23 brilliant because the flexographic ink is applied at a much larger
24 film thickness than can be applied by the lithographic process and
25 is not diluted by dampening solution.

26 Preferably, the doctor blade assembly 68 is constructed
27 as described in U.S. Patent 5,176,077 (DeMoore), which is
28 incorporated herein by reference.

29 The applicator head 60 includes side frame members 74,
30 76 which support the applicator roller 66, gear train 64, gear
31 train 65, doctor blade assembly 68 and the drive motor 62. The
32 applicator roller 66 is supported at opposite ends on a lower
33 cradle formed by a pair of end plates 78, 80 which hold the
34 applicator roller 66 in parallel alignment with the blanket
35 cylinder 34 (FIGURE 5). The side frame 74, 76 are also provided

1 with an upper cradle formed by a pair of side plates 82, 84 which
2 are vertically spaced with respect to the lower side plates 78,
3 80. Each cradle has a pair of sockets 79, 81 and 83, 85,
4 respectively, for holding an applicator roller 66 for spot coating
5 or inking engagement against the plate P of the plate cylinder 32
6 (FIGURE 4) or the blanket B of the blanket cylinder 34.

7 Preferably, the applicator roller 66 for the upper
8 cradle (plate) position is an anilox roller having a resilient
9 transfer surface. In the dual cradle arrangement, the press
10 operator can quickly change over from blanket inking/coating and
11 plate inking/coating with minimum press down time, since it is
12 only necessary to remove and reposition or replace the applicator
13 roller 66, and wash-up the doctor blade assembly if changing from
14 ink to coating or vice versa. The capability to selectively
15 operate in either the flexographic mode or the lithographic mode
16 and to print or coat from either the plate or blanket position is
17 referred to herein as the "LITHOFLEX" principle.

18 According to an important feature of the present
19 invention, the applicator head 60 is supported by the carriage
20 assembly 58 in a cantilevered, pivotal arrangement which allows
21 the dual cradle inking/coating apparatus 10 and single cradle
22 inking/coating apparatus 110 to be installed and used between any
23 two adjacent printing units, as well as installed on the first and
24 last printing units of the press. This is made possible by a pair
25 of cantilevered support arms 88, 90 which are pivotally coupled to
26 the side plates 74, 76, respectively, on a pivot shaft 77. Each
27 support arm has a hub portion 88A, 90A, respectively and an
28 elongated shank portion 88B, 90B, respectively. The elongated
29 shank portion extends transversely with respect to the shank
30 portion, and preferably extend perpendicularly with respect to
31 each other.

32 The cantilevered support arms are pivotally mounted on
33 the printing tower by pivot blocks 92, 94, respectively. The hub
34 portions 88A, 90A are journaled for rotation on pivot shafts 96,
35 98, respectively. The pivot blocks 92, 94 are securely fastened

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1 to the tower 14D, so that the carriage assembly 86 is pivotally
2 suspended from the pivot shafts 96, 98 in a cantilevered Ferris
3 support arrangement. The shank portions 88B, 90B are pivotally
4 coupled to the pivot shaft 77, so that the carriage assembly 58
5 and the applicator head 60 are capable of independent rotation
6 with respect to each and with respect to the pivot shaft 77. By
7 this arrangement, the applicator head 60 is pivotally suspended
8 from the pivot shaft 77, and remains in an upright orientation as
9 the support arms rotate from the operative position to the fully
10 retracted position and vice versa.

11 Thus, the cradles 78, 80 and 82, 84 position the
12 applicator roller 66 in vertical and horizontal alignment with the
13 plate cylinder or blanket cylinder when the applicator head is
14 extended to the operative position. Moreover, because of the
15 transverse relationship between the hub portion and shank portion
16 of the support arms, the applicator head 60 and carriage assembly
17 58 are capable of rotating through a Ferris arc without touching
18 the adjacent tower. This makes it possible to install the
19 inking/coating apparatus 10 on any intermediate printing unit
20 tower (T2, T3), and as well as the first printing unit tower T1
21 and the last printing unit tower T4. Additionally, because of the
22 transverse relationship of the support arm hub portion and shank
23 portion, the lateral projection of the applicator head 60 into the
24 interstation space between printing units is minimized, thus
25 assuring virtually unrestricted operator access in the inter-
26 station space between adjacent printing units when the applicator
27 head is engaged in the operative position, and completely
28 unrestricted access when the applicator head is completely
29 retracted.

30 As shown in FIGURE 1 and FIGURE 2, rotation of the
31 carriage assembly 58 is counterclockwise from the retracted
32 position (shown in phantom) to the operative position. The
33 carriage assembly can be adapted for clockwise rotation from the
34 retracted position to the operative position for engagement of the
35 applicator roller to either the plate cylinder or the blanket

1 cylinder on the dampener side of the tower, assuming that access
2 to the plate and blanket is not restricted by dampener rollers or
3 the like.

4 Rotational movement of the support arms 88, 90 is
5 assisted by counterweights 100, 102 which are secured to the
6 support arms, respectively, for concurrent rotation with respect
7 to the pivot blocks 92, 94. With the passive assistance of the
8 counterweights, the press operator can easily move the ink-
9 ing/coating assembly 10 from the engaged operative position as
10 shown in FIGURE 4 to the fully retracted idle position as shown in
11 phantom in FIGURE 1. Preferably, rotation of the carriage
12 assembly 58 is assisted by power means such as a torsion spring,
13 electric motor, or hydraulic motor.

14 The inking/coating apparatus 10 is releasably locked
15 into the engaged position as shown in FIGURE 4 by releasable latch
16 couplings 103, 105 which secure the support arms 88, 90 to the
17 press side frames 14, 15, respectively, of the printing unit tower
18 T4 in the operative position. Coating engagement of the applica-
19 tor roller 66 against the blanket cylinder 34 is produced by power
20 actuators, preferably pneumatic cylinders 104, 106 which have
21 extendable/retractable power transfer arms 104A, 106A, respective-
22 ly. The pneumatic cylinder 104 is pivotally coupled to the
23 support arm 88 by a pivot linkage 108, and the second pneumatic
24 cylinder 106 is pivotally coupled to the support arm 90 by a pivot
25 linkage 109. In response to actuation of the pneumatic cylinders
26 104, 106, the power transfer arms are retracted. As the arms
27 retract, the inking/coating head 60 is rotated counterclockwise on
28 the pivot shaft 77, thus moving the applicator roller 66 into
29 coating engagement with the blanket cylinder 34.

30 The pivot linkage 108 includes a bell crank 111 which is
31 mounted for pivotal movement on a pin 113. The pin 113 is
32 supported by a clevis plate 115 which is attached to the support
33 arm 88. One end of the bell crank is pivotally coupled to the
34 actuator arm 104A, and a cam roller 117 is mounted for rotation on
35 its opposite end.

1 The cam roller 117 is engagable against an adjustable
2 stop 119 which is rigidly secured to the side plate 74. Counter-
3 clockwise shifting of the handle H moves a cam follower 121 into
4 a latch pocket 123 of a receiver block 125 as the cam roller 117
5 is moved into engagement with the adjustable stop 119 in the
6 interlocked, operative position. Referring to FIGURE 4, FIGURE 5
7 and FIGURE 6, the receiver block is rigidly secured to the
8 delivery side face of the printing unit tower by machine screws.

9 When the plate P goes on impression, power is applied to
10 the pneumatic actuator 104 and the power transfer arm 104A
11 retracts, thus causing the bell crank 111 to rotate counterclock-
12 wise about the pin 113. The torque applied by the actuator is
13 transmitted to the applicator head 60 through the cam roller 117
14 and the adjustable stop 119. Counterclockwise movement of the
15 applicator head 60 relative to the support shaft 77 carries the
16 applicator roller 66 into engagement with the plate P.

17 The adjustable stop 119 has a threaded bolt 119A which
18 is engagable with the cam roller 117. The striking point of
19 engagement is preset so that the applicator roller 66 is properly
20 positioned for engagement with the plate P or blanket B when the
21 applicator head 60 is interlocked with the press frame 14 and the
22 printing unit goes on impression.

23 Referring to FIGURE 5, an inking/coating apparatus 110
24 having a single head is illustrated. The construction of this
25 alternative embodiment is identical in all respects with the dual
26 head arrangement, with the exception that only a single gear train
27 and a single cradle for holding the applicator roller is provided.
28 In both embodiments, the inking/coating head 60 remains upright as
29 it swings through an arc, similar to the movement of a Ferris
30 wheel. Because of the upright orientation of the inking/coating
31 head 60 as it moves between the extended and retracted positions,
32 the usual platform spacing between printing unit towers provides
33 adequate clearance to permit extension and retraction of the
34 carriage assembly 58 without interference with operator access to
35 the printing units. This is a significant advantage in that it

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1 permits the in-line inking/coating apparatus to operate effective-
2 ly in the interstation space between any adjacent printing units,
3 and without blocking or obstructing access to the cylinders of the
4 printing units when the inking/coating apparatus is in the fully
5 retracted position as indicated in FIGURE 1.

6 Moreover, when the in-line inking/coating apparatus is
7 in the fully retracted position, the applicator roller 66 is
8 conveniently positioned on the dampener side of the printing unit
9 for inspection, clean-up or removal. Additionally, the doctor
10 blade assembly is also conveniently positioned for inspection,
11 removal, adjustment or clean-up. The doctor blade reservoir and
12 coating circulation lines can also be cleaned while the printing
13 unit is running as well as when the press has been stopped for
14 change-over from one type of ink or coating to another.

15 When the inking/coating apparatus is used for applying
16 an aqueous ink or an aqueous coating material, the water component
17 on the freshly printed sheet S is evaporated by a high velocity,
18 hot air interstation dryer and high volume heat and moisture
19 extractor units 112 and 114, as shown in FIGURE 1, FIGURE 4 and
20 FIGURE 5. The dryer/extractor units 112 and 114 are oriented to
21 direct high velocity heated air onto the freshly printed/coated
22 sheet as it is transferred by the impression cylinder 36 and the
23 intermediate transfer cylinder 40. By this arrangement, the
24 freshly printed aqueous ink or coating is completely dry before
25 the sheet is overprinted in the next printing unit.

26 The high velocity, hot air dryer and high performance
27 heat and moisture extractor units 112, 114 utilize high velocity
28 air jets which scrub and break-up the moist air level which clings
29 to the surface of each freshly printed sheet. Within each dryer,
30 high velocity air is heated to a high temperature as it flows
31 across a resistance heating element within an air delivery baffle
32 tube. High velocity jets of hot air are discharged through
33 multiple airflow apertures through an exposure zone Z (FIGURE 4
34 and FIGURE 5) onto the freshly printed/coated sheet S as it is
35 transferred by the impression cylinder 36 and transfer cylinder

1 40, respectively. Each dryer assembly includes a pair of air
2 delivery dryer heads which are arranged in spaced, side-by-side
3 relation. The high velocity, hot air dryer and high performance
4 heat and moisture extractor units 112, 114 are preferably
5 constructed as disclosed in co-pending U.S. Patent Application
6 Serial No. 08/132,584, filed October 6, 1993, entitled "High
7 Velocity Hot Air Dryer", assigned to the assignee of the present
8 invention and which is incorporated herein by reference.

9 The high velocity, hot moisture-laden air displaced from
10 each printed sheet is extracted from the dryer exposure zone Z and
11 completely exhausted from the printing unit by the high volume
12 extractors. Each extractor head includes a manifold coupled to
13 the dryer heads and draws the moisture, volatiles and high
14 velocity hot air through a longitudinal gap between the dryer
15 heads. According to this arrangement, each printed sheet is dried
16 before it is run through the next printing unit.

17 The water-based inks used in flexographic printing dry
18 at a relatively moderate drying temperature provided by the
19 interstation high velocity hot air dryers/extractors 112, 114.
20 Because each freshly printed sheet is dried between each printing
21 unit, clarity and print quality are substantially improved since
22 the aqueous ink is dried at each printing unit before it enters
23 the next printing unit. Since the aqueous ink is dry before the
24 sheet enters the next printing unit, back-trapping on the blanket
25 of the next printing unit is completely eliminated. This
26 interstation drying arrangement makes it possible to print aqueous
27 inks such as metallic ink and opaque white ink at one printing
28 unit, and then overprint at the next printing unit.

29 Moreover, this arrangement permits the first printing
30 unit to be used as a coater in which an aqueous coating is applied
31 to low grade paper such as recycled paper to trap and seal
32 lint, dust, spray powder and other debris and provide a smoother
33 durable surface which is overprinted in the next printing unit.
34 An UV-curable coating can be applied over the first down over
35 printed (aqueous) coating in the last printing unit. The first

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1 down layer seals the surface of the low grade, rough substrate and
2 improves overprinted dot definition while preventing strike-
3 through and show-through.

4 Preferably, the applicator roller 66 is either metal or
5 ceramic when it is used for applying a coating material to the
6 blanket B on the cylinder 34. When the applicator roller 66 is
7 applied to the plate, it is preferably constructed as an anilox
8 roller having a resilient transfer surface for engaging a
9 flexographic printing plate. Suitable resilient roller surface
10 materials include Buna N synthetic rubber and EPDM (terpolymer
11 elastomer).

12 It will be appreciated that the inking/coating apparatus
13 10 is capable of applying a wide range of ink types, including
14 fluorescent (Day Glo), pearlescent, metallics (gold, silver and
15 other metallics), glitter, scratch and sniff (micro-encapsulated
16 fragrance), scratch and reveal, luminous, pressure-sensitive
17 adhesives and the like.

18 The press operator can eliminate the dampener roller
19 assembly altogether, and the inking/coating apparatus 10 can
20 selectively apply aqueous inks and coatings to a flexographic or
21 waterless printing plate and the blanket. Moreover, overprinting
22 of the aqueous inks and coatings can be carried out in the next
23 printing unit since the aqueous inks and coatings are completely
24 dried by the high velocity, hot air interstation dryer and high
25 volume heat and moisture extractor assembly of the present
26 invention.

27 The aqueous inks and coatings as used in the present
28 invention contain colored pigments and/or soluble dyes, binders
29 which fix the pigments onto the surface of the printed sheet and
30 waxes, defoamers and thickeners. Aqueous printing inks predomi-
31 nantly contain water as a solvent, diluent and/or vehicle. The
32 thickeners which are preferred include algonates, starch,
33 cellulose and its derivatives, for example cellulose esters or
34 cellulose ethers and the like. Coloring agents including organic
35 as well as inorganic pigments may be derived from dyes which are

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1 insoluble in water. Also, the printing ink may contain water and
2 may be predominantly glycol or the like, with the pigment being
3 bound by an appropriate resin. When metallic inks are printed,
4 the cells of the anilox roller must be appropriately sized to
5 prevent the metal particles from getting stuck within the cells.
6 The cell size is critical, and for metallic gold ink, the anilox
7 roller should have a screen line count in the range of 175-300
8 lines per inch.

9 The inking/coating apparatus 10 can also apply UV-
10 curable inks and coatings. If UV-curable inks and coatings are
11 utilized, ultra-violet dryers/extractors are installed adjacent
12 the high velocity hot air dryer/extractor units 112, 114,
13 respectively.

14 Moreover, by utilizing the coating apparatus on the
15 first printing unit, a seal coating can be applied to trap lint,
16 spray powder, dust and other debris, and cover defects on lower
17 grade paper which will improve print quality, which can then be
18 overprinted on the next in-line printing unit.

19 It will be appreciated that the "LITHOFLEX" system
20 described herein makes it possible to selectively operate a
21 printing unit in either the flexographic printing mode or the
22 lithographic printing mode, while also providing the capability to
23 print or coat from either the plate or blanket position. The dual
24 cradle support arrangement of the present invention makes it
25 possible to quickly change over from inking/coating at the blanket
26 cylinder position to inking/coating at the plate cylinder position
27 with minimum press down-time, since it is only necessary to remove
28 and reposition or replace the applicator roller 66 while the
29 printing/inking apparatus is in the retracted position.

30 Moreover, the press operator may elect to spot or
31 overall coat with aqueous ink/coating from the plate for one job,
32 and then spot and/or overall coat from the blanket during the next
33 job. Since the doctor blade assembly can be flushed and washed-up
34 quickly and the applicator roller can be changed out quickly, it
35 is possible to spot coat or overall coat from the plate position

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1 or the blanket position with aqueous inks or coatings during the
2 first press run and then spot coat or overall coat with UV-curable
3 inks or coatings from the plate position or from the blanket
4 position during the next press run. The inking/coating apparatus
5 is completely out of the way in the retracted position; conse-
6 quently, the doctor blade reservoir and supply lines may be
7 flushed and washed-up by automatic wash-up equipment while the
8 printing unit is printing another job.

9 The positioning of the applicator head and roller
10 assembly relative to the plate and blanket is repeatable to a pre-
11 determined, preset impression position. Consequently, no printing
12 unit adjustment or alteration is required, except for flushing the
13 doctor blade assembly and cleaning or replacing the applicator
14 roller to accommodate a different kind of ink or coating.
15 Although manual extension and retraction have been described in
16 connection with the exemplary embodiment, extension to the
17 operative position and retraction to a non-operative position can
18 be carried out automatically by hydraulic or electric motor
19 servomechanisms.

20 The cantilevered, Ferris wheel support arrangement
21 allows the inking/coating apparatus to operate effectively in the
22 interstation space between any adjacent printing units, as well as
23 on the first or last printing units of the press, without blocking
24 or obstructing the interstation space or restricting operator
25 access to the cylinders of any of the printing units.

26 Finally, because the inking/coating apparatus of the
27 present invention is mounted on a printing unit tower and is
28 extendable to the operative position without requiring adjustment
29 or alteration of the printing unit cylinders, it can be used for
30 applying ink or coating to the blanket cylinder of a rotary offset
31 web press, or to the blanket of a dedicated coating unit.

32 Although the present invention and its advantages have
33 been described in detail, it should be understood that various
34 changes, substitutions and alterations may be made herein without

- 1 departing from the spirit and scope of the present invention as
- 2 defined by the appended claims.

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What is claimed is:

1 1. In a printing press of the type having side frame
2 members forming a printing unit tower on which a plate cylinder
3 and blanket cylinder are supported for rotation, the improvement
4 comprising:

5 inking/coating apparatus for applying ink or
6 coating material to a plate mounted on the plate cylinder or to a
7 blanket mounted on the blanket cylinder when the inking/coating
8 apparatus is in an operative position; and,

9 a carriage assembly including a support arm having
10 a first end portion pivotally coupled to the printing unit tower
11 and a second end portion pivotally coupled to the inking/coating
12 apparatus, the carriage assembly being movable to an operative
13 position in which the inking/coating apparatus is suspended
14 laterally adjacent to the plate and blanket cylinders, and being
15 movable to a retracted position in which the inking/coating
16 apparatus is elevated with respect to the plate and blanket
17 cylinders.

1 2. The invention as set forth in claim 1, wherein the
2 inking/coating apparatus comprises:

3 a doctor blade assembly having a reservoir for
4 receiving ink or liquid coating material;

5 an applicator roller coupled to the doctor blade
6 assembly in fluid communication with the reservoir, the applicator
7 roller being engagable with a printing plate on the plate cylinder
8 or with a blanket on the blanket cylinder when the inking/coating
9 apparatus is in the operative position.

1 3. The invention as set forth in claim 2, the
2 applicator roller comprising:

3 an anilox roller having a resilient transfer
4 surface.

4. The invention as set forth in claim 1, including a counterweight coupled to the support arm.

1 5. The invention as set forth in claim 1, further
2 comprising:

3 a power actuator pivotally coupled to the support
4 arm, the power actuator having a power transfer arm which is
5 extendable and retractable; and,

6 apparatus coupled to the power transfer arm for
7 converting extension or retraction movement of the power transfer
8 arm into pivotal movement of the inking/coating apparatus relative
9 to the support arm.

1 6. The invention as set forth in claim 5, in which the
2 movement converting apparatus comprises:

3 a bell crank plate having a first end portion
4 coupled to the power transfer arm and having a second end portion
5 for engaging a stop member;

6 a stop member secured to the inking/coating
7 apparatus; and,

8 a clevis plate secured to the support arm and
9 pivotally coupled to the bell crank plate.

1 7. The invention as set forth in claim 1, the
2 inking/coating apparatus comprising:

3 an applicator head having first and second side
4 frame members pivotally coupled to the carriage assembly;

5 a doctor blade assembly mounted between the first
6 and second side frame members, the doctor blade assembly including
7 a reservoir for receiving ink or liquid coating material;

8 cradle means mounted on the first and second side
9 frame members, respectively;

10 an applicator roller mounted for rotation on the
11 cradle means and coupled to the doctor blade assembly for rolling
12 contact with ink or coating material in the reservoir, the

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13 applicator roller being engagable with a printing plate on the
14 plate cylinder or with a blanket on the blanket cylinder in the
15 operative position; and,
16 motor means coupled to the applicator roller for
17 rotating the applicator roller.

1 8. The invention as set forth in claim 7,
2 the cradle means including first and second sockets
3 disposed on the first and second side frame members respectively;
4 and,
5 the applicator roller being mounted for rotation on
6 the first and second sockets.

1 9. The invention as set forth in claim 7,
2 the cradle means including first and second sockets
3 disposed on the first and second side frame members, respectively,
4 and third and fourth sockets disposed on the first and second side
5 frame members, respectively;
6 the applicator roller being mountable for rotation
7 on the first and second sockets for applying ink or coating
8 material to the plate when the carriage assembly is in the
9 operative position; and,
10 the applicator roller being mountable for rotation
11 on the third and fourth sockets for applying ink or coating
12 material to the blanket when the carriage assembly is in the
13 operative position.

1 10. The invention as set forth in claim 1, comprising:
2 male and female latch coupling members mounted on
3 the carriage assembly and on the printing unit tower, respective-
4 ly, for releasably latching the carriage assembly in interlocking
5 engagement with the printing unit tower in the operative position.

1 11. The invention as set forth in claim 1, wherein the
2 support arm comprises an elongated shank portion and a hub portion

3 which extends transversely with respect to the shank portion, the
4 elongated shank portion being pivotally coupled to the ink-
5 ing/coating apparatus and the hub portion being pivotally coupled
6 to the printing unit tower.

1 12. A sheet-fed, rotary offset printing press compris-
2 ing, in combination:

3 at least one printing unit or dedicated coating
4 unit having side frame members forming a tower;

5 at least one cylinder mounted for rotation on the
6 tower for printing ink or coating material onto sheets passing
7 through the printing unit or dedicated coating unit;

8 inking/coating apparatus including a doctor blade
9 assembly having a reservoir for holding ink or coating liquid, a
10 rotatable applicator roller and means for applying ink or coating
11 liquid from the reservoir onto a peripheral surface portion of the
12 applicator roller; and,

13 support apparatus mounted on the printing unit
14 tower for pivotal movement, said support apparatus being movably
15 coupled to the inking/coating apparatus for supporting the
16 inking/coating apparatus for movement to an operative position in
17 which the applicator roller is engagable with a plate or a blanket
18 on the cylinder, and for movement to a retracted position in which
19 the inking/coating apparatus is supported at an elevated position
20 above the cylinder.

1 13. A rotary offset printing press comprising, in
2 combination:

3 a plate cylinder having a printing plate mounted
4 thereon;

5 a blanket cylinder having an ink receptive blanket
6 disposed in ink transfer engagement with the plate cylinder for
7 transferring ink from the image surface areas of the printing
8 plate to the ink receptive blanket;

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9 an impression cylinder disposed adjacent the
10 blanket cylinder thereby defining a nip between the impression
11 cylinder and the blanket whereby the printing ink is transferred
12 from the blanket to a substrate as the substrate is transferred
13 through the nip;

14 inking/coating apparatus for applying ink or
15 coating material to the plate or to the blanket;

16 support apparatus mounted on the printing press for
17 pivotal movement, said support apparatus being movably coupled to
18 the coating apparatus for supporting the inking/coating apparatus
19 for movement to an operative position in which the inking/coating
20 apparatus is engagable with the plate or the blanket, and for
21 movement to a retracted position in which the inking/coating
22 apparatus is supported at an elevated position above the press;
23 and,

24 a dryer mounted on the press for discharging heated
25 air on the freshly printed substrate.

1 14. A rotary offset printing press as defined in claim
2 13, wherein:

3 the dryer is mounted adjacent the impression
4 cylinder for discharging heated air onto a freshly printed
5 substrate while the substrate is in contact with the impression
6 cylinder.

1 15. A rotary offset printing press as defined in claim
2 13, comprising:

3 an extractor coupled to the dryer for extracting
4 hot air, moisture and volatiles from an exposure zone between the
5 dryer and the freshly printed substrate.

1 16. A rotary offset printing press as defined in claim
2 13, comprising:

3 a transfer cylinder disposed in an interstation
4 position on the press and coupled in sheet transfer relation with
5 the impression cylinder; and,

6 an interstation dryer disposed adjacent the
7 transfer cylinder for discharging heated air onto a freshly
8 printed or coated substrate after it has been transferred from the
9 impression cylinder and while it is in contact with the inter-
10 mediate transfer cylinder.

1 17. In a printing press of the type having side frame
2 members forming a tower on which a blanket cylinder is supported
3 for rotation, the improvement comprising:

4 inking/coating apparatus for applying ink or
5 coating material to a blanket mounted on the blanket cylinder when
6 the inking/coating apparatus is in an operative position; and,

7 a carriage assembly movably coupled to the tower
8 and to the inking/coating apparatus for producing Ferris wheel
9 movement of the inking/coating apparatus to the operative position
10 in which the inking/coating apparatus is suspended laterally
11 adjacent to the blanket cylinder, and to a retracted position in
12 which the inking/coating apparatus is elevated with respect to the
13 blanket cylinder.

1 18. The invention as set forth in claim 17, wherein the
2 tower includes a plate cylinder and a plate mounted on the plate
3 cylinder, the inking/coating apparatus including:

4 first cradle means for supporting an applicator
5 roller for engagement against the plate when the inking/coating
6 apparatus is in the operative position; and,

7 second cradle means for supporting an applicator
8 roller for engagement against the blanket when the inking/coating
9 apparatus is in the operative position.

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1 19. The invention as set forth in claim 17, comprising:
2 said carriage assembly including a support arm
3 having a first end portion pivotally coupled to the tower and
4 having a second end portion;
5 a common pivot shaft on which the support arm
6 second end portion and the inking/coating apparatus are pivotally
7 mounted; and,
8 male and female latch members coupled between the
9 common pivot shaft and the tower, with one of the latch members
10 being secured to the common pivot shaft and the other latch member
11 being secured to the tower, the latch members being mateable in
12 interlocking engagement when the inking/coating apparatus is in
13 the operative position.

1 20. The invention as set forth in claim 17, further
2 comprising:
3 a power actuator pivotally coupled to the support
4 arm, the power actuator having a power transfer arm which is
5 extendable and retractable; and,
6 apparatus coupled to the power transfer arm for
7 converting extension or retraction movement of the power transfer
8 arm into pivotal movement of the inking/coating apparatus relative
9 to the common pivot shaft.

1 21. The invention as set forth in claim 20, in which
2 the movement converting apparatus comprises:
3 a bell crank plate having a first end portion
4 coupled to the power transfer arm and having a second end portion
5 for engaging a stop member;
6 a stop member secured to the inking/coating
7 apparatus; and,
8 a clevis plate secured to the support arm and
9 pivotally coupled to the bell crank plate.

6 contact with an intermediate transfer cylinder, but before it is
7 processed in the second printing unit.

1 26. A method for rotary offset printing as defined in
2 claim 24,

3 wherein the drying step is performed by directing
4 high velocity, heated air onto the freshly printed/coated
5 substrate while the freshly printed/coated substrate is in contact
6 with an impression cylinder.

1 27. A method for rotary offset printing as defined in
2 claim 24, including the steps:

3 transferring the freshly printed substrate to an
4 intermediate transfer cylinder; and,

5 drying the freshly printed substrate while it is in
6 contact with the intermediate transfer cylinder.

1 28. A method for rotary offset printing as defined in
2 claim 24, including the step:

3 extracting hot air, moisture and volatiles from an
4 exposure zone above the freshly printed/coated substrate while the
5 freshly printed/coated substrate is in contact with the impression
6 cylinder.

1 29. A method for rotary offset printing as defined in
2 claim 24, including the steps:

3 applying a primer coating of an aqueous coating
4 material or UV-curable coating material to a substrate in the
5 first printing unit;

6 trapping and sealing dust, lint, spray powder and
7 other debris under the primer coating; and,

8 drying the primer coating on the substrate before
9 the substrate is overprinted in the second printing unit.

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1 30. A method for rotary offset printing in a rotary
2 offset press of the type including first and second printing
3 units, and using aqueous or UV-curable printing ink/coating
4 material in the operation of at least the first printing unit
5 comprising the following steps performed at each printing unit in
6 succession:

7 transferring the printing ink/coating material to
8 a printing plate at the first printing unit;

9 transferring the printing ink/coating material from
10 the printing plate to a blanket;

11 transferring the printed image from the blanket to
12 a substrate as the substrate is transferred through the nip
13 between an impression cylinder and the blanket; and,

14 drying the printing ink on the freshly printed
15 substrate before the substrate is processed in the second printing
16 unit.

1 31. A method for rotary offset printing as defined in
2 claim 30,

3 wherein the drying step is performed by discharging
4 hot air onto the freshly printed substrate after it has been
5 transferred from the first printing unit and while it is in
6 contact with an intermediate transfer cylinder, but before it is
7 processed in the second printing unit.

1 32. A method for rotary offset printing as defined in
2 claim 30, wherein the drying step is performed by directing high
3 velocity, heated air onto the freshly printed substrate while the
4 freshly printed substrate is in contact with the impression
5 cylinder.

1 33. A method for rotary offset printing as defined in
2 claim 30, including the steps:

3 transferring the freshly printed substrate to an
4 intermediate transfer cylinder; and,

5 drying the freshly printed substrate while it is in
6 contact with the intermediate transfer cylinder.

1 34. A method for rotary offset printing as defined in
2 claim 30, including the step:

3 extracting hot air, moisture and volatiles from an
4 exposure zone above the substrate while the substrate is in
5 contact with the impression cylinder.

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UTILITY

Attorney Docket
No. B6012

DECLARATION AND POWER OF ATTORNEY

We, RONALD M. RENDLEMAN, HOWARD W. DEMOORE, JOHN W. BIRD, joint inventors herein, hereby declare that:

Our residence, post office address and citizenship are as stated below next to our names.

We believe that we are the original, first and joint inventors of the subject matter which is claimed and for which a patent is sought on the invention entitled

"RETRACTABLE INKING/COATING APPARATUS HAVING
FERRIS MOVEMENT BETWEEN PRINTING UNITS",

the specification of which is attached hereto.

We hereby state that we have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to in this declaration.

We each individually acknowledge the duty to disclose to the U.S. Patent Office all information known to me that is material to the patentability of any claim in accordance with Title 37, Code of Federal Regulations, §1.56, and which is material to the examination of this application, namely, information where there is a substantial likelihood that a reasonable examiner would consider it important in deciding whether to allow the application to issue as a patent.

We hereby claim foreign priority benefits under Title 35, United States Code §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

<u>Country</u>	<u>Application No.</u>	<u>Filing Date</u> <u>(day, month, year)</u>
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- NONE -

We hereby claim the benefit under Title 35, United

States Code §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code §112, we acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

<u>U.S. Serial No.</u>	<u>U.S. Filing Date</u>	<u>Status</u>
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- NONE -

We hereby appoint DENNIS T. GRIGGS, Registration No. 27,790, of the firm of AKIN, GUMP, STRAUSS, HAUER & FELD, L.L.P., our attorney to prosecute this application and to transact all business in the U.S. Patent and Trademark Office connected therewith. We request that all correspondence be addressed to:

Dennis T. Griggs -
Akin, Gump, Strauss, Hauer & Feld, L.L.P.
1700 Pacific Avenue, Suite 4100
Dallas, Texas 75201-4618

Phone: 214/969-2747

We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issued thereon.

Full name of first joint Inventor: Ronald M. Rendleman 1-00
Residence: Dallas, Texas TX
Citizenship: U.S.
Post Office Address: 4331 Royal Ridge
Dallas, Texas 75229

Date: 5/1/95

Ronald M. Rendleman
OUL →

Full name of
second joint Inventor: Howard W. DeMoore 2-00
Residence: Dallas, Texas
Citizenship: U.S. TX
Post Office Address: 10954 Shady Trail
Dallas, Texas 75220

Date: May 1, 1995 Howard W. DeMoore
Howard W. DeMoore

Full name of
third joint Inventor: John W. Bird 3-00
Residence: Carrollton, Texas
Citizenship: U.S. TX
Post Office Address: 1514 Iroquois Circle
Carrollton, Texas 75007

Date: May 1, 1995 John W. Bird
John W. Bird

00315796 051804

SMALL ENTITY
INDEPENDENT INVENTOR

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

DECLARATION CLAIMING SMALL ENTITY STATUS
(37 C.F.R. §1.9(f) and §1.27 (b)) - INDEPENDENT INVENTOR

I, RONALD M. RENDLEMAN, hereby declare that I qualify as an independent inventor as defined in 37 C.F.R. §1.9(c) for the purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, to the U.S. Patent and Trademark Office with regard to the invention entitled

"RETRACTABLE INKING/COATING APPARATUS HAVING
FERRIS MOVEMENT BETWEEN PRINTING UNITS"

X in the application filed herewith.

_____ in U.S. application Serial No. _____ filed

_____ patent No. _____, issued _____.

I have not assigned, granted, conveyed or licensed, and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 C.F.R. §1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 C.F.R. §1.9(d) or a non-profit organization under 37 C.F.R. §1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under any obligation under contract or law to assign, grant, convey, or license any rights in the invention is identified below:

_____ no such person, concern or organization exists.

X any such person, concern or organization is identified below, if applicable:

Full Name Howard W. DeMoore

Address 10954 Shady Trail

Dallas, Texas 75220

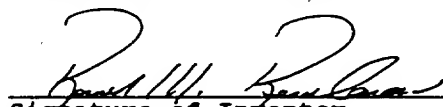
☒ individual ☐ small business concern
☐ nonprofit organization

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate pursuant to 37 C.F.R. §1.28(b).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Printed Name of Inventor: Ronald M. Rendleman

Date: 5/1/95


Signature of Inventor

SMALL ENTITY
INDEPENDENT INVENTOR

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

DECLARATION CLAIMING SMALL ENTITY STATUS
(37 C.F.R. §1.9(f) and §1.27 (b)) - INDEPENDENT INVENTOR

I, HOWARD W. DEMOORE, hereby declare that I qualify as an independent inventor as defined in 37 C.F.R. §1.9(c) for the purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, to the U.S. Patent and Trademark Office with regard to the invention entitled

"RETRACTABLE INKING/COATING APPARATUS HAVING
FERRIS MOVEMENT BETWEEN PRINTING UNITS"☒ X in the application filed herewith.☐ in U.S. application Serial No. _____ filed _____.☐ patent No. _____, issued _____.

I have not assigned, granted, conveyed or licensed, and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 C.F.R. §1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 C.F.R. §1.9(d) or a non-profit organization under 37 C.F.R. §1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under any obligation under contract or law to assign, grant, convey, or license any rights in the invention is identified below:

☐ no such person, concern or organization exists.☒ X any such person, concern or organization is identified below, if applicable:

Full Name Printing Research, Inc.

Address 10954 Shady Trail

Dallas, Texas 75220

 individual X small business concern

 nonprofit organization

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate pursuant to 37 C.F.R. §1.28(b).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Printed Name of Inventor: Howard W. DeMoore

Date: May 1, 1990

Howard W. DeMoore
Signature of Inventor

SMALL ENTITY
INDEPENDENT INVENTOR

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

DECLARATION CLAIMING SMALL ENTITY STATUS
(37 C.F.R. §1.9(f) and §1.27 (b)) - INDEPENDENT INVENTOR

I, JOHN W. BIRD, hereby declare that I qualify as an independent inventor as defined in 37 C.F.R. §1.9(c) for the purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, to the U.S. Patent and Trademark Office with regard to the invention entitled

"RETRACTABLE INKING/COATING APPARATUS HAVING
FERRIS MOVEMENT BETWEEN PRINTING UNITS"

X in the application filed herewith.

_____ in U.S. application Serial No. _____ filed _____.

_____ patent No. _____, issued _____.

I have not assigned, granted, conveyed or licensed, and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 C.F.R. §1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 C.F.R. §1.9(d) or a non-profit organization under 37 C.F.R. §1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under any obligation under contract or law to assign, grant, convey, or license any rights in the invention is identified below:

_____ no such person, concern or organization exists.

X any such person, concern or organization is identified below, if applicable:

Full Name Howard W. DeMoore

Address 10954 Shady Trail

Dallas, Texas 75220

☒ Individual ☐ small business concern

☐ nonprofit organization

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate pursuant to 37 C.F.R. §1.28(b).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Printed Name of Inventor: John W. Bird

Date: May 1, 1995

John W. Bird
Signature of Inventor

B6012

SMALL ENTITY
SMALL BUSINESS CONCERN

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL
ENTITY STATUS (37 C.F.R. §1.9(f) and §1.27(c))--
SMALL BUSINESS CONCERNI, HOWARD W. DEMOORE

hereby declare that I am

☐ the owner of the small business concern identified below:☒ an official of the small business concern empowered to act on behalf of the concern identified below:NAME OF CONCERN Printing Research, Inc.ADDRESS OF CONCERN 10954 Shady TrailDallas, Texas 75220

I hereby declare that the above-identified small business concern qualifies as a small business concern as defined in 13 C.F.R. §121.3-18, and reproduced in 37 C.F.R. §1.9(d), for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when, either directly or indirectly, one concern controls or has the power to control the other, or a third-party or parties controls or has the power to control both.

I hereby declare that rights under license, contract or law have been acquired by or conveyed to and remain with the small business concern identified above with regard to the invention entitled

"RETRACTABLE INKING/COATING APPARATUS HAVING
FERRIS MOVEMENT BETWEEN PRINTING UNITS"

by inventors Ronald M. Rendleman, Howard W. DeMoore and
John W. Bird

as described in

- ☒ the specification filed herewith.
☐ the specification filed _____ under Serial
No. _____
☐ Patent No. _____, issued _____.

If the rights held by the above-identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed below and no rights to the invention are held by any person, other than the inventor, who could not qualify as a small business concern under 37 C.F.R. §1.9(d) or by any concern which would not qualify as a small business concern under 37 C.F.R. §1.9(d) or a nonprofit organization under 37 C.F.R. §1.9(e).

- ☒ no such person, concern or organization exists
☐ any such person, concern or organization is identified below, if applicable:

Full Name _____

Address _____

- ☐ individual ☐ small business concern
☐ nonprofit organization

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small business entity is no longer appropriate. (37 C.F.R. §1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or

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imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

TYPED NAME OF PERSON SIGNING Howard W. DeMoore

TITLE OF PERSON OTHER THAN OWNER President and Chairman of
the Board

Date: 1 May 1975

Howard W. DeMoore
Signature

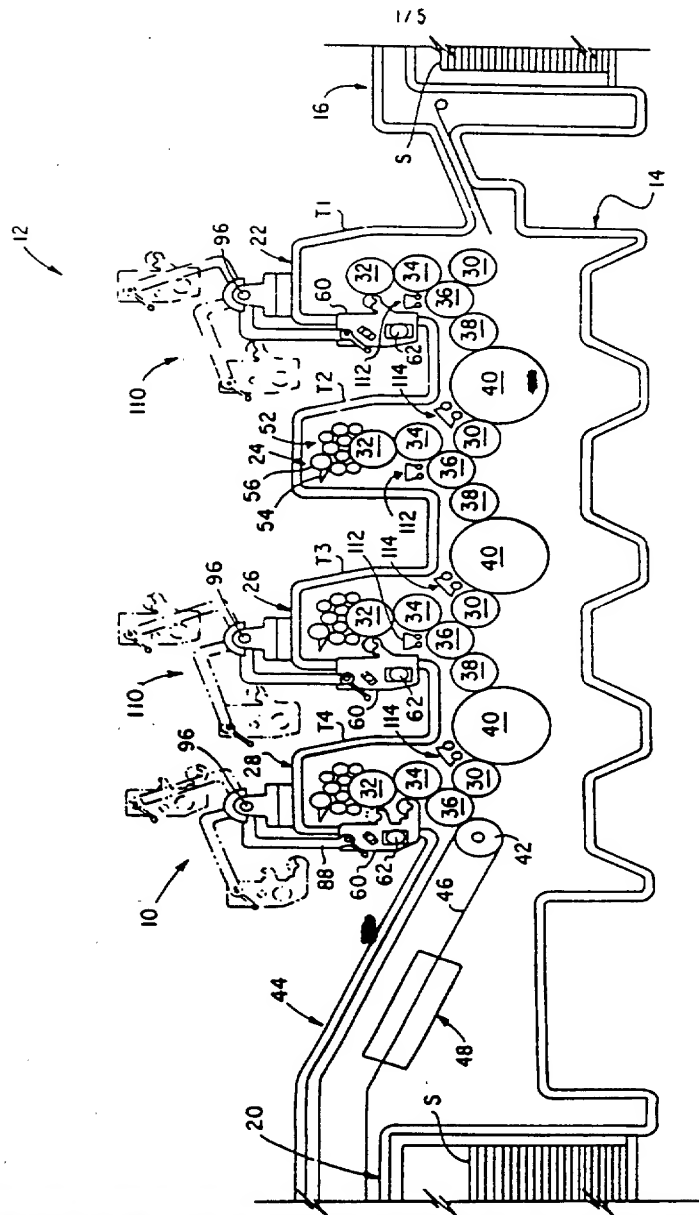


FIG. 1

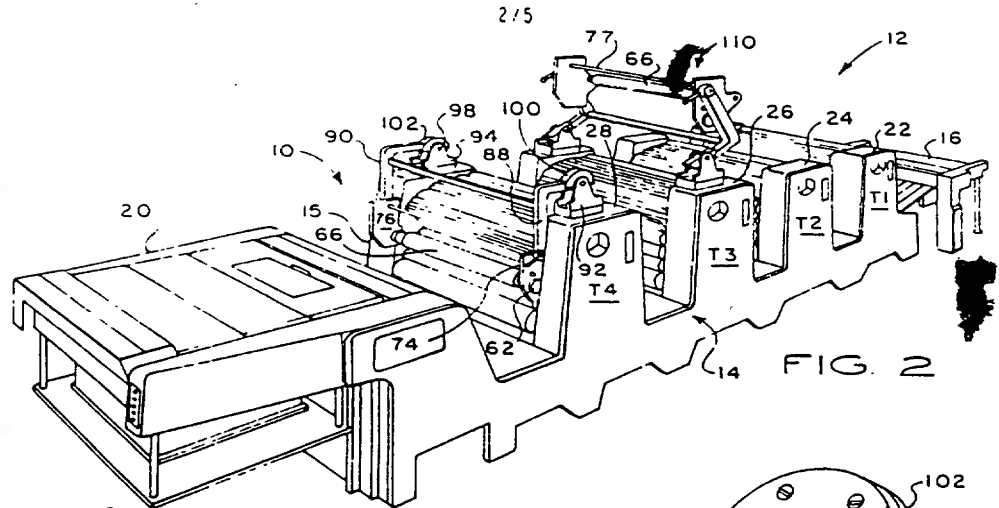


FIG. 2

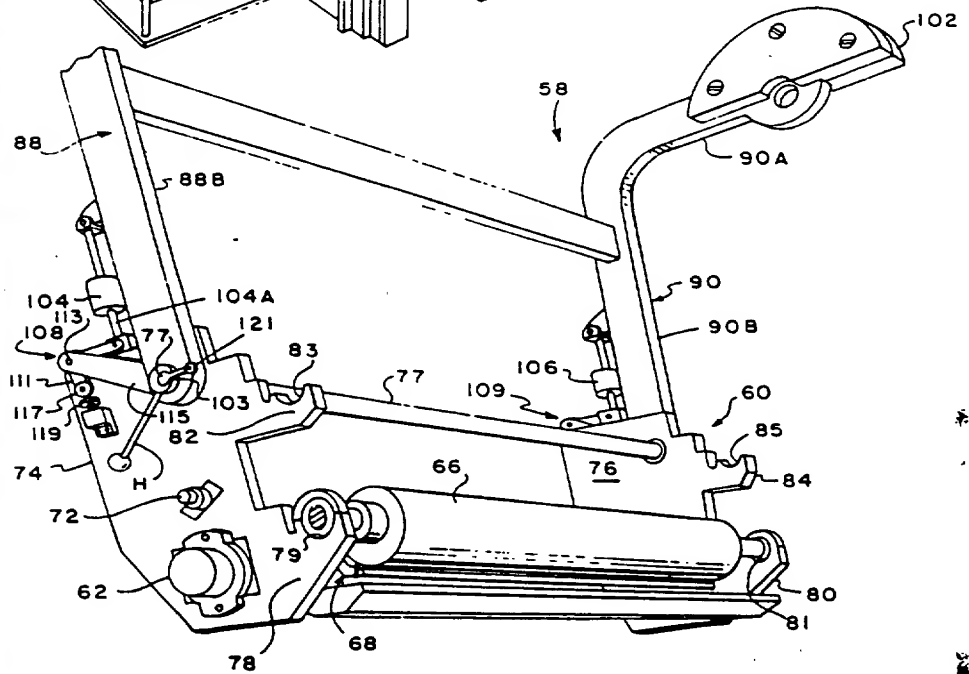


FIG. 3

FIG. 2

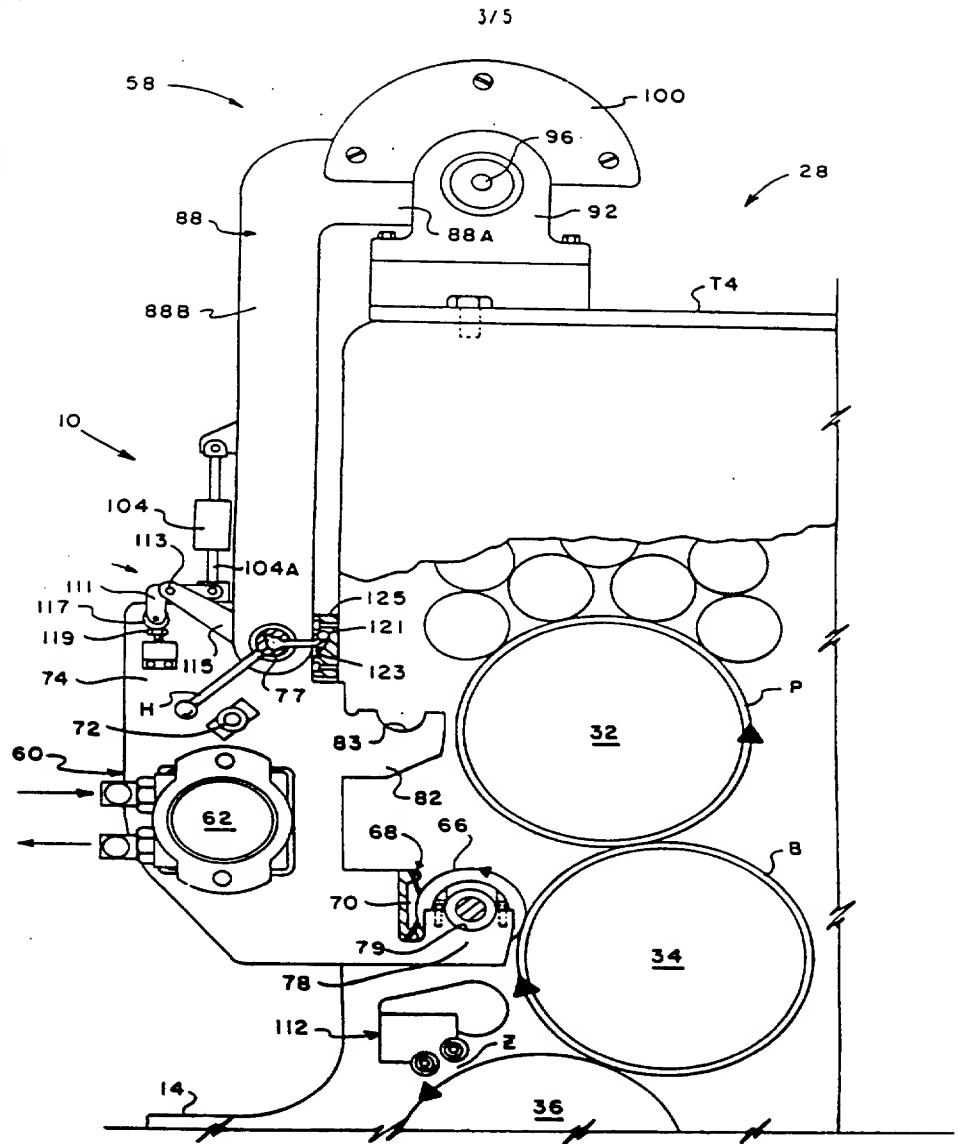
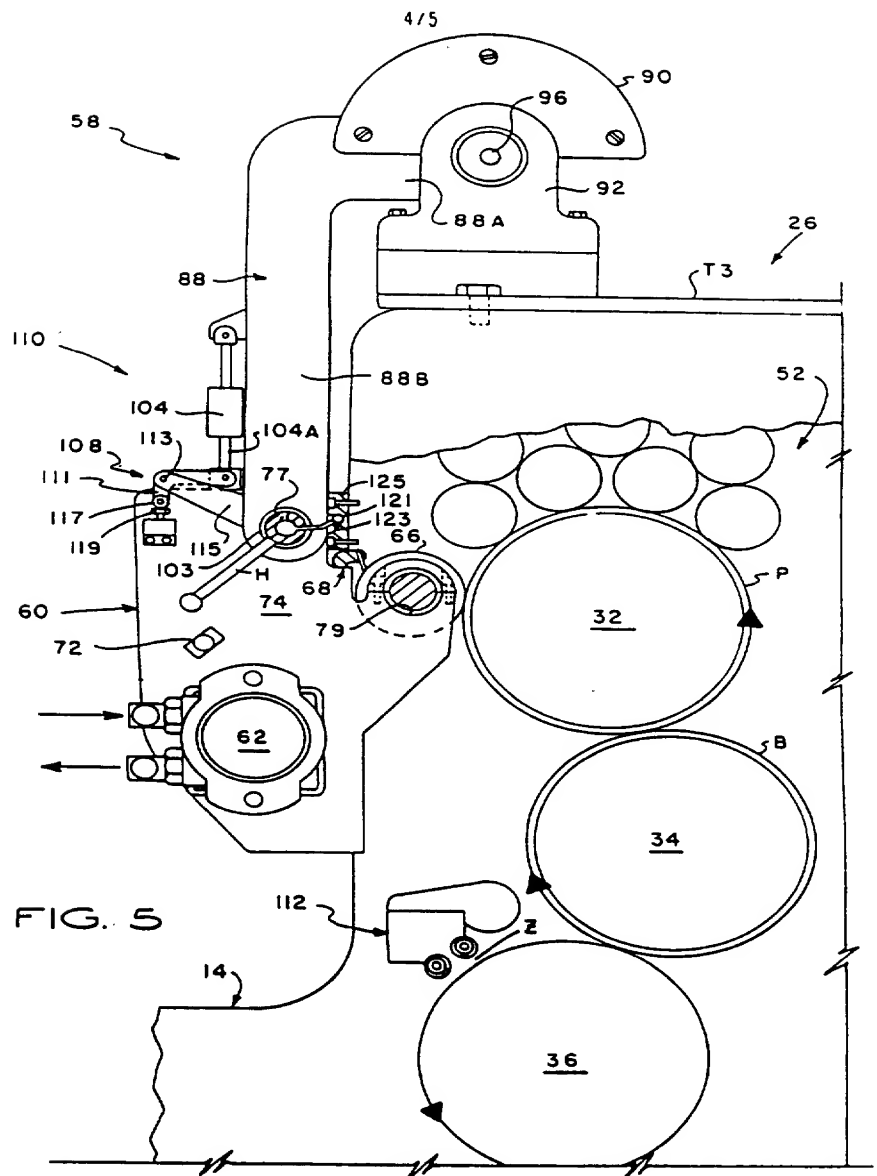


FIG. 4



U.S. DEPARTMENT OF COMMERCE
United States Patent and Trademark Office

*THIS IS TO CERTIFY that page (s) fig-6 is
missing from the U.S. Patent and Trademark Office microform
records.*

K. White
Certifying Officer

5/6/96
DATE

100-333-364-60

to comply with a provision which "is both reasonable and of material significance to the franchise relationship" pursuant to § 2802(b)(2)(A), which justified nonrenewal. Moreover, plaintiff's failure to maintain the premises in a clean manner is also a proper ground for nonrenewal under § 2802(b)(3)(C). Therefore, defendant can properly end the franchise relationship with the plaintiff.



PENNWALT CORPORATION, Plaintiff,

v.

AKZONA INC. and Armak
Co., Defendants.

Civ. A. No. 79-157.

United States District Court,
D. Delaware.

Aug. 22, 1983.

Plaintiff brought declaratory judgment action to declare invalid and unenforceable patent it had already infringed. The District Court, Latchum, Chief Judge, held that: (1) patent was invalid as "in public use"; (2) parties' product development agreement afforded no basis for holding plaintiff liable for damages for breach of contract; (3) plaintiff was not liable to defendant for breach of contract implied from unauthorized use of its trade secret or unauthorized use of its trade secret unjustly enriching plaintiff; and (4) plaintiff was not entitled to attorney fees under statute providing for such fees in "exceptional case."

Ordered accordingly.

1. Patents ⇐90(1)

To come within purview of statute allowing later-filed patent application to

claim benefit of one or more earlier filed applications, later application must, among other things, disclose same invention as has previously been disclosed in each prior application, and each application must comply with statute governing specification. 35 U.S.C.A. §§ 112, 120.

2. Patents ⇐90(1)

Claims of patent were not entitled to filing date of grandparent application, because they depend on entirely new matter added by subsequent continuation-in-part application, and because for purposes of statute governing specification, the prior application lacked an enabling disclosure and failed to set forth best mode. 35 U.S.C.A. §§ 112, 120.

3. Patents ⇐99

Mere reference to another application, patent or publication, is not an incorporation of anything therein into application containing such reference for purpose of disclosure required by patent statute governing specification. 35 U.S.C.A. § 112.

4. Patents ⇐76, 80

Plaintiff's sales of its trademarked agricultural insecticide suspended in xanthan gum, in accordance with claims of patent pertaining to an insecticidal composition, were made more than one year prior to filing date of patent application, and such public use and sales were not justified under "experimental use" doctrine, notwithstanding that sales were made under temporary Environmental Protection Agency experimental use permit; therefore, those sales constituted an absolute statutory bar to patentability under statute providing that no patent will be granted where invention was in public use or on sale one year prior to date of application for patent. 35 U.S.C.A. § 102(b).

5. Patents ⇐80

Patent No. 4,196,292, pertaining to an insecticidal composition consisting essentially of a polymer-encapsulated insecticide suspended in an aqueous dispersion of xanthan gum, was invalid under statutory subsection providing that a person shall be

entitled to a patent unless, inter alia, invention was in public use or on sale in United States more than one year prior to date of application for patent. 35 U.S.C.A. § 102(b).

6. Patents ⇐80

Single unrestricted public use or sale brings into operation bar to patentability set forth in statute providing that no patent will be granted where invention was in public use or on sale in United States more than one year prior to date of patent application. 35 U.S.C.A. § 102(b).

7. Patents ⇐75, 76

Bar to patentability set forth in statute providing that a person shall be entitled to a patent unless, inter alia, invention was in public use or on sale in United States more than one year prior to date of application for patent does not require invention to be placed in public use or on sale by patentee because such use or sale by third party, with or without consent of inventor, is sufficient to invalidate any patent subsequently obtained if use or sale occurred more than one year prior to issue. 35 U.S.C.A. § 102(b).

8. Patents ⇐75, 76

"Experimental use" doctrine, developed under patent law, which is an exception to bar to patentability set forth in statute providing that no patent will issue where invention was in public use or on sale in United States more than one year prior to date of patent application, is not coextensive with and does not have same meaning as "experimental use" of pesticides conducted under an Environmental Protection Agency temporary permit issued under environmental protection laws. 35 U.S.C.A. § 102(b).

9. Patents ⇐75, 76

Bar to patentability in statute providing that a person shall be entitled to patent unless invention was in public use or on sale in United States more than one year prior to date of application for patent, can be extended for reasonable period if experimentation is undertaken to demonstrate utility of claimed invention and its lack of

need for further improvement. 35 U.S.C.A. § 102(b).

10. Patents ⇐75, 76

For purposes of bar to patentability in statute providing that no patent will be granted where invention was in public use or on sale in United States more than one year prior to date of application for patent, and exception to that bar for "experimental use," use or sale labeled "experimental" by government regulatory agency is not necessarily "experimental" under patent laws. 35 U.S.C.A. § 102(b).

11. Patents ⇐75

Experimentation to perfect nonclaimed features of an invention does not fall within experimental-use exception to bar to patentability in statute providing that a person shall be entitled to a patent unless, inter alia, invention was in public use or on sale in United States more than one year prior to date of application for patent. 35 U.S.C.A. § 102(b).

12. Patents ⇐81

For purposes of experimental-use exception to bar to patentability set forth in statute providing that no patent will issue where invention was in public use or on sale in United States more than one year prior to date of application for patent, absence of any restriction by patentee on uses of patented invention is indicative of nonexperimental purpose. 35 U.S.C.A. § 102(b).

13. Patents ⇐81

To avoid bar to patentability set forth in statute providing that a person shall be entitled to a patent unless invention was in public use or on sale in United States more than one year prior to date of patent application, inventor must show that transferee lacked authority to use invention or exploit its commercial value, but where an inventor sells or delivers invention to another without any enforceable obligation for other to hold invention for experimental purposes only, unrestricted sale or delivery will invalidate the patent. 35 U.S.C.A. § 102(b).

14. Patents ⇐81

For purposes of experimental-use exception to bar to patentability in statute providing that no patent will be granted where invention was in public use or on sale in United States more than one year prior to date of application for patent, a factor that is indicative of nonexperimental purpose is failure to require test reports. 35 U.S.C.A. § 102(b).

15. Patents ⇐75, 76

Where person has authority to use invention commercially or sell to others without any duty to experiment further, there is a "sale" within meaning of statute providing that person shall be entitled to patent unless invention was in public use or on sale in United States more than one year prior to date of application for patent, and experimental-use exception does not apply. 35 U.S.C.A. § 102(b).

16. Patents ⇐75

Market testing and product introduction are not "experimental uses" for purposes of experimental-use exception to bar to patentability set forth in statute providing that a person shall be entitled to a patent unless invention was in public use or on sale in United States more than one year prior to date of application for patent. 35 U.S.C.A. § 102(b).

17. Patents ⇐75, 76

Experimental-use exception to bar to patentability in statute providing that no patent will issue where invention was in public use or on sale in United States more than one year prior to date of application for patent, applies to experiments of inventor or persons under his control, not to third parties. 35 U.S.C.A. § 102(b).

18. Contracts ⇐170(1)

Faced with contradictory testimony, courts turn, as an important aid to construction of contract, to examine practical construction placed on agreement by parties themselves.

19. Contracts ⇐201

Xanthan gum was not within scope of parties' product development agreement,

and therefore defendant's submission of that material to plaintiff for use as a suspending agent was not pursuant to that agreement so as to obligate plaintiff to enter into licensee agreement and pay royalties thereunder.

20. Implied and Constructive Contracts ⇐3

Plaintiff, which used defendant's product as a suspending agent in its insecticide, was not liable to defendant for breach of contract implied from unauthorized use of defendant's trade secret or unauthorized use of defendant's trade secret unjustly enriching plaintiff, because when defendant first requested plaintiff's help in solving problem with insecticide, it was seeking free technical or customer service, when defendant shipped samples it never indicated that compensation was expected, and defendant did not indicate that responding to plaintiff's request for customer service, defendant was intending to establish a confidential relationship.

21. Patents ⇐325.11(3)

There were genuine issues of material fact in dispute over validity of patent which could not be resolved by summary judgment; therefore, bad faith could not be attributed to defendant for opposing plaintiff's summary judgment motion so as to make case "exceptional" and entitle plaintiff to attorney fees under statute. 35 U.S.C.A. § 285.

22. Patents ⇐325.11(3)

Where patent was found to be invalid under "in public use" and "on sale" statutory bar, and court intentionally refrained from passing on all of plaintiff's claims that patent was unenforceable on ground that fraud was practiced in Patent Office, plaintiff was not entitled to attorney fees on basis that patentee intentionally practiced fraud upon Patent Office so as to make case "exceptional" within meaning of statute providing for fees. 35 U.S.C.A. § 285.

Robert K. Payson and Michael D. Goldman of Potter, Anderson & Corroon, Wil-

mington, Del., Arthur H. Seidel and Daniel A. Monaco of Seidel, Gonda & Goldhammer, P.C., Philadelphia, Pa., of counsel, for plaintiff.

John G. Mulford of Theisen, Lank, Mulford and Goldberg, P.A., Wilmington, Del., and Phillip M. Mayer of Leydig, Voit, Osann, Mayer & Holt, Ltd., Chicago, Ill., for defendants.

OPINION

LATCHUM, Chief Judge.

Pennwalt Corporation ("Pennwalt") commenced this patent suit on March 26, 1979 in which it seeks a declaratory judgment of invalidity and unenforceability of U.S. Patent No. 4,196,292 ("the '292" or "Nemeth patent") entitled "Stable Water Dispersions of Encapsulated Parathion," issued August 15, 1978 to Harold C. Nemeth. (Docket Item ["D.I."] 1.) The named defendants are Akzona, Inc. ("Akhzona"), and its subsidiary Armak Co. ("Armak"). (*Id.*) The '292 patent is assigned to Akzona but the parties have agreed that Armak should be treated as the patent owner for purposes of this litigation. (D.I. 99, ¶ 1.) Armak has counterclaimed, charging that Pennwalt's agricultural insecticide trademarked "Penncap M"¹ infringes the '292 patent and in addition seeks substantial damages from Pennwalt for Penncap M sales over a six year period before the '292 patent issued based on three alternative theories: (a) breach of the 1963 Product Development Agreement ("PDA") entered into between the parties, (b) breach of implied contract to pay for the use of a trade secret, and (c) unjust enrichment for using confidential information. (D.I. 29.) Pennwalt does not contest infringement of the '292 patent (D.I. 99, ¶ 29), but has raised the defenses of the statute of limitations, laches, waiver and estoppel to Armak's counterclaim for breach of contract, breach of implied contract, and unjust enrichment. (D.I. 100 & 102.) The opposing parties seek attorneys' fees under 35 U.S.C. § 285. (D.I. 99, ¶ 1.)

1. Pennwalt's agricultural insecticides are trademarked as "Penncap M," "Penncap E," and "Knox-out," but the parties agree that "Penn-

The liability phase of this case was tried to the Court without a jury for nine days between February 18 and February 25, 1983. The parties have completed their post-trial briefing (D.I. 128, 129 & 130) and the case is ready for a decision on the liability issues.

Pennwalt specifically contends that the '292 patent is invalid for any one of the following reasons: (1) under 35 U.S.C. § 103 because the subject matter claimed in the '292 patent was obvious; (2) under 35 U.S.C. § 102(g) because the patented Nemeth invention was made in this country before Nemeth by a Pennwalt employee, Chester B. DeSavigny, who had not abandoned, suppressed or concealed it; (3) under 35 U.S.C. § 102(b) because the '292 invention was publicly used and on sale more than one year prior to the filing of the continuation-in-part Serial No. 457,152 ("the '152 application") on April 1, 1974, the first application complying with the requirements of 35 U.S.C. § 112, and because Nemeth is not entitled to the March 1, 1972 filing date of application Serial No. 230,935 ("the '935 application") under 35 U.S.C. § 120 in that the '935 application failed to set forth the "best mode" known to Nemeth and lacked an enabling disclosure as required by 35 U.S.C. § 112.

Finally, Pennwalt argues that the patent is unenforceable because it was procured by fraud upon the Patent Office in that: (1) Nemeth and Armak failed to advise the Patent Office that Pennwalt was making the claimed invention and selling it for more than a year before the filing date of the '152 application; (2) Nemeth falsely represented in the '935 application that he had conducted field tests prior to March 1, 1972; (3) Nemeth deliberately misidentified General Mills' experimental gums "X-383S" and "XG-458S" to the Patent Office as xanthan gum in the '935 application; (4) Nemeth concealed the fact that tragacanth gum "worked" in the '935 application; (5)

cap M" should be considered as representative of all of Pennwalt's alleged infringing products. (D.I. 99, ¶ 1.)

Nemeth misrepresented that his invention was the result of a "long search" in the '152 application; and (6) Table IV of the '292 patent is the result of concealment and commingling of laboratory data and procedures.

I. VALIDITY

1. *Earliest Filing Date*

The '292 patent pertains to an insecticidal composition consisting essentially of a polymer-encapsulated insecticide suspended in an aqueous dispersion of xanthan gum (D.I. 99, ¶ 3.5). On its face, the '292 patent claims the benefit of the March 1, 1972 filing date of the '935 original grandparent application. (TX 201.)² Pennwalt contends that the '292 patent is not entitled to the March 1, 1972 filing date and the Court agrees.

[1] 35 U.S.C. § 120 allows a later-filed application, under specified circumstances, to claim the benefit of one or more earlier filed applications. It is well established that to come within the purview of § 120, (1) a later application must, among other things, disclose the same invention as has previously been disclosed in each prior application, and (2) each application must comply with 35 U.S.C. § 112. 35 U.S.C. § 120; see, e.g., *Acme Highway Products Corp. v. D.S. Brown Co.*, 431 F.2d 1074, 1078 (6th Cir.1970), cert. denied, 401 U.S. 956, 94 S.Ct. 125, 38 L.Ed.2d 57 (1971); *Bendix Corp. v. Balax, Inc.*, 421 F.2d 809, 816-17 (7th Cir.), cert. denied, 399 U.S. 911, 90 S.Ct. 2203, 26 L.Ed.2d 562 (1970), reh. denied, 414 U.S. 819, 94 S.Ct. 43, 38 L.Ed.2d 51 (1973); *Chromalloy American Corp. v. Alloy Surfaces Co.*, 339 F.Supp. 859, 874 (D.Del.1972).

[2] In the present case, the claims of the '292 patent are not entitled to the filing date of the grandparent application '935 of March 1, 1972, because they depend on entirely new matter added by the continuation-in-part ("C.I.P.") application '152 filed on April 1, 1974.

2. TX refers to Armak's trial exhibits and PX refers to Pennwalt's trial exhibits; Tr. refers to

Claim 1, the broadest claim of the '292 patent, recites the following insecticidal composition (TX 201, Col. 14, line 52):

1. An insecticidal composition consisting essentially of an aqueous dispersion of:

(a) from about 1% to about 40% by weight of said composition of capsules of a member of the group consisting of a phosphoromonothioate and a phosphorodithioate insecticide encapsulated in a skin selected from the group consisting of a polyamide, a polyurea, and a mixed polyamide-polyurea cross-linked with a cross-linking agent selected from the group consisting of a polyalkylene polyamine and a polyfunctional isocyanate;

(b) from about 0.1% to about 0.5% by weight of said composition of a xanthan gum dispersant for said capsules; and

(c) balance water.

Succinctly stated, three distinct types of polymer encapsulated insecticides are claimed: polyamide capsule; polyurea capsule; and cross-linked polyamide-polyurea capsule.

However, the '935 application discloses only xanthan gum dispersions of *polyamide*-encapsulated insecticides (PX 900 "O"). Nowhere in the '935 file wrapper is there any reference of polyurea-encapsulated insecticides, nor is there mention of cross-linked polyamide-polyurea encapsulated insecticides (PX 900 "O"; Tr. 1466-73). Nowhere in the '935 application is there any teaching that isocyanates could be used to produce polyureas or polyamide-polyurea copolymers (PX 900 "O"; Tr. 1467). The sole teaching of the '935 application is directed to polyamide microcapsule suspensions (PX 2, pp. 4-6, 8).

The only specific polyamide taught in the '935 application is the reaction product of adipoyl chloride and lysine in the "Background of the Invention" (PX 2, p. 5). This reaction produces a linear, non-cross-linked polyamide (Tr. 903).

the trial transcripts found in D.I. 116 through 124.

Claim 1 of the '292 patent defines encapsulating polymers in a Markush group (TX 201, col. 14, line 57):

[E]ncapsulated in a skin selected from a group consisting of a polyamide, a polyurea, and a mixed polyamide-polyurea cross-linked

The members of a Markush group are exclusive with respect to each other (Tr. 1470). The Manual of Patenting Examining Procedure ("MPEP") states that a Markush "type of claim is employed where there is no commonly accepted generic expression which is commensurate in scope with the field which the applicant desires to cover" (PX 1002), and this rule has been part of MPEP since at least 1964 (Tr. 1472). Nemeth, having included polyamide and polyamide-polyurea copolymers in a Markush group in the '292 claim, is now estopped from asserting in this litigation, that "polyamide" used in the '935 application is generic for cross-linked polyamide-polyurea. Indeed, there is no teaching in the '935 application that "polyamide" is used other than in its ordinary meaning to an organic chemist, which would be a plastic with long linear molecules. (Tr. 1467.)

Furthermore, there is no presumption of entitlement to the '935 filing date by the issuance of the '292 patent. The effective date of the C.I.P. claims (and the claims of the '292 patent) was never decided by the Patent Examiner. Under the MPEP, patent examiners do not ordinarily make such determinations, except in the case of "intervening art" or in case of an interference (PX 1001):

Unless the filing date of the earlier application is actually needed, for example, in the case of an interference or to overcome a reference, there is no need to make a determination as to whether the requirement of 35 U.S.C. 120, that the earlier application disclose the invention of the second application in the manner provided by the first paragraph of 35 U.S.C. 112, is met and whether a substantial portion or all of the earlier applica-

tion is repeated in the second application in a continuation-in-part situation.

MPEP § 201.08 (1982 rev.)

While the above provision was added to the MPEP after the filing date of C.I.P. '152 application, it represents a codification of pre-existing Patent Office Practice (Tr. 1459). Thus the Examiner of the '292 patent never determined the effective filing date of the claims in that patent. The new matter added by the C.I.P. on April 1, 1974 which was not disclosed in the earlier '935 application is not entitled under 35 U.S.C. § 120 to filing date of the earlier '935 application for non-disclosed matter. Such non-disclosed matter is entitled to the filing date of the C.I.P. filed on April 1, 1974. *In re Lukach*, 442 F.2d 967, 969, 58 CCPA 1302 (1971); *In re Ruscetta and Jenny*, 255 F.2d 687, 690-91, 45 CCPA 968 (1958); *In re Steenbock*, 83 F.2d 912, 913 (Cust. & Pat.App.1936).

Secondly, as mentioned earlier, in order to obtain the benefit of the filing date of a co-pending patent application, the claims of a C.I.P. application, in accordance with 35 U.S.C. § 120, must comply with the "enabling" and "best mode" disclosure requirements of the first paragraph of 35 U.S.C. § 112.

The '935 application was finally rejected by the Patent Examiner because it lacked an enabling disclosure and failed to set forth the best mode (PX 2, pp. 35-38). The basis for both rejections was substantially the same, that is, the '935 application described the encapsulating material only as a "polyamide" without identifying a specific polyamide or a method of preparation. (*Id.*).

"Polyamide" encompasses a virtually unlimited variety of diverse chemical compounds (Tr. 314; 528; 905; 1123). Armak argues that "polyamide" is not so vast and that one skilled in the art would ignore the limitless linear polyamides which do not work and focus only on narrow subgenus polyamide types possessing the requisite time-release qualities necessary for use as insecticide microcapsules, in other words,

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the cross-linked polyamide-polyurea copolymers (D.I. 128, pp. 80-83).

However, as above mentioned, the only specific polyamide that appears in the '935 application is under the "Background of the Invention" and not under "detail Description of the Invention" or under "Examples," the usual place where one skilled in the art would expect to find an enabling disclosure of the claimed invention (PX 2, p. 5). But as discussed above, the adipoyl chloride-lysine reaction referred to therein produces a linear non-cross-linked polyamide, lacking time release characteristics (Tr. 902-904). The capsule releases its contents by degradation not by diffusion (Tr. 1186). The capsule so formed is especially susceptible to degradation induced by interaction with negatively charged chemicals, is thin-walled and fragile and will rupture during passage through spraying equipment (Tr. 1180-81; 1034).

The Patent Examiner expressly held that the teaching of adipoyl chloride-lysine capsules in the "Background of the Invention" did not sufficiently characterize the capsules and could not be considered a specific "polyamide" as required by the best mode requirements of § 112 (PX 2, p. 26). Nemeth argued in reply that the disclosure of "polyamide" in the '935 application coupled with the three Pennwalt U.S. Patents and one Pennwalt British Patent³ referred to in the "Background" constituted both an enabling and best mode disclosure (PX 2, pp. 30-31). The Patent Examiner disagreed and expressly ruled that the four Pennwalt patents were not incorporated by reference (PX 2, pp. 36-38). No appeal was taken by Nemeth.

Armak relies on one of the four Pennwalt patents, cited in the '935 application [the British Vandegaer patent, 1,091,141 (PX 603)] to supply an enabling disclosure. However, the Patent Examiner specifically ruled that this British patent was not incorporated by reference in the '935 application because MPEP 608.01(p) provides that "es-

sentia material may not be incorporated by reference to foreign patents" (PX 2, p. 36). To allow Armak now in this litigation to claim that the four Pennwalt patents add an enabling disclosure to the '935 application would render the MPEP a nullity.

[3] The Patent Examiner further ruled that the British Vandegaer '141 and the other three Pennwalt patents were not part of the '935 disclosure because they were not included with the requisite specificity. A mere *reference* to another application, patent or publication, is not an *incorporation* of anything therein into the application containing such reference for the purpose of the disclosure required by 35 U.S.C. § 112. *In re Seversky*, 474 F.2d 671, 674 (Cust. & Pat.App.1973).

Even assuming that the four Pennwalt patents were properly incorporated in the '935 application, it is still non-enabling because one skilled in the art could not make and use the invention without undue experimentation. The Pennwalt microencapsulation patents (PX 600-603) teach a wide range of encapsulating polymers. British Vandegaer '141, in particular, teaches an infinite variety of polymers (Tr. 1126-27). The '935 application contains no teaching leading one skilled in the art through this range of polymers to the cross-linked polyamide and polyurea copolymers which support the claims of the '292 patent. One skilled in the art would be directed to "polyamide" capsules, specifically the ingestible capsule of Santo '776 (PX 602) which is wholly unsuitable as a time-release insecticide microcapsule.

The Court also finds that *In re Herschler*, 591 F.2d 693 (Cust. & Pat.App.1979), upon which Armak relies, is not applicable to this case because the written description in the '935 application which discloses the sole encapsulating material as "polyamide," (which does not work) furnishes absolutely no guide to predicting polymers which may be used to encapsulate insecticides. Thus the Court finds that the claims of the '292

3. Pennwalt's U.S. Patents referred to in the '935 application were Nos. 3,464,926 (PX 600); 3,492,380 (PX 601); and 3,607,776 (PX

602) and Pennwalt's British Patent No. 1,091,141 (PX 603).

patent are not supported by the disclosures in the '935 application and they are not entitled to the '935 filing date of March 1, 1972. *In re Smith*, 458 F.2d 1389, 1394, 59 CCPA 1025 (1972); *In re Lukach*, 442 F.2d 967, 969, 58 CCPA 1233 (1971); *In re Ahlbrecht*, 435 F.2d 908, 910-11, 58 CCPA 848 (1971).

Finally, the '935 application did not disclose the best mode as required by § 112. The only mode known to Nemeth prior to March 1, 1972 was a xanthan gum suspension of Penncap M's microcapsules. Nemeth's original suspension tests were conducted in April, 1971 when he used xanthan gum, trademarked as Kelzan by Kelco Co., to suspend "Penncap M" capsules (Tr. 100-106). By August, 1971, Nemeth knew that the Pennwalt material that he was working with was Pennwalt's encapsulated methyl parathion commercially identified as "Penn-cap M" (Tr. 83; TX 129 at Bates A07068). Also prior to filing the '935 application, Armak's patent attorney who prosecuted the '935 application knew that Pennwalt's microencapsulated insecticide carried the trademark "Penncap M" (Tr. 537; PX 18). However, Armak chose not to identify this material by Pennwalt's trademark. This was not done until the later-filed '152 C.I.P. Thus, the best mode and only mode known to Nemeth was not disclosed in the '935 application as required by § 112.

Accordingly, the Court finds that the claims of the '292 patent are not entitled to the March 1, 1972 filing date of the '935 application but can only be accorded the filing date of the C.I.P. '152 application on April 1, 1974. This finding should not come as a surprise to Armak. Sidney Shapiro, who was Nemeth's supervisor in 1971 and who followed the patent proceedings (Tr. 229), believed in early 1974 that Armak was not entitled to the 1972 filing date of the '935 application. Shapiro wrote in a memorandum, dated January 24, 1974:

2. "Serial No. 230,935 by Harold Nemeth filed March 1, 1972"

4. The material Armak furnished to Pennwalt under its designation "RD-4237" was an industrial grade xanthan gum which Armak purchased from Kelco Co., under the latter's trade-

This filing date has been lost and we will have to refile. We are shooting for a mid-February new filing date. We cannot file earlier until we obtain a definition of the nature of the capsules given in examples in the Pennwalt patent. [Emphasis added].

(PX 38; see also Tr. 349.)

Furthermore, this also appears to have been the belief of Jack Hall, Armak's attorney, who prosecuted the '935 application and filed the C.I.P. '152 application (Tr. 601-603).

2. In Public Use and On Sale Issue

The Court having determined that the claims of the '292 patent can only be accorded the April 1, 1974 filing date of the C.I.P. '152 application (the first application complying with the requirements of § 112), the Court must next decide whether the patented invention was in public use or on sale in this country more than one year prior to April 1, 1974 as Pennwalt contends.

The evidence is undisputed that between July 18 and August 7, 1972, Pennwalt manufactured at its plant in Bryan, Texas, six batches of approximately 4,300 gals. of Penncap M suspended in xanthan gum acquired from Armak and designated by Armak as "RD-4237" (PX 508; Tr. 922-23).⁴ Prior to packaging the Penncap M into 5-gallon containers, by Pennwalt, a sample of each batch was removed for three-part quality control testing: (1) chemical assay, (2) toxicology, and (3) cricket bioassay, and each of the six batches of Penncap M produced in 1972 with RD-4237 passed all three tests and were released for sale (Tr. 931-33; 735-47; PX 504 and 544).

Armak sent several samples of RD-4237 to Pennwalt in 1971 and an additional pound was sent February 18, 1972. A 20-pound shipment was received by Pennwalt before the July 18, 1972 first batch was run. In response to Pennwalt's request, 100

mark "Kelzan," but Armak removed the Kelzan labels before shipping the xanthan gum to Pennwalt (Tr. 70, 97-100; 253-54).

pounds of RD-4237 free of charge was shipped on July 21, 1972 and finally a 300-pound shipment of RD-4237 was sent in August, 1972, and represented Pennwalt's first purchase of RD-4237 from Armak. (D.I. 99, ¶¶ 3.24 & 26.) Nemeth, who supervised the shipments, was aware that the xanthan gum would be used by Pennwalt at 0.1-0.5 weight per cent to suspend Penncap M (TX 178 at Bates A005351, Tr. 123).

Despite a diligent search,⁵ only six Pennwalt sales invoices have been found which showed that 1,220 gallons of Penncap M dispersed in xanthan gum were sold from the six batches made in 1972 (PX 509; Tr. 944-53). These invoices reflect the following sales: (1) Pennwalt on August 22, 1972 sold 400 gallons from the August 2, 1972 batch to Helena Chemical Company for \$900 (PX 509 at Bates 04282-284; Tr. 948, 827); (2) Pennwalt on four different occasions between August 24 and September 19, 1972 sold 1,015 gallons to Smith-Douglas of Norfolk, Va., the distribution branch of Borden Company, for \$4,567.50 (PX 509 at Bates 04283-85, 04287, 04288); and (3) on August 29, 1972 Pennwalt sold a 5-gallon can to Stauffer Chemical Company in Houston, Texas for \$22.50 (PX 432D; Tr. 1205).

These sales of Penncap M, except for the Stauffer sale, were made directly to distributors who sold to farmer users (Tr. 827). Stauffer purchased Penncap M solely for its own purpose of evaluating a competitor's product (Tr. 1191-92). The \$4.50 per gallon distributor price reflected on the invoices was set at that price to allow normal distributor and retail margins (Tr. 1429).

[4-7] These sales of 1,220 gallons of Penncap M suspended in xanthan gum in accordance with the claims of the '292 patent, were all made prior to April 1, 1973 and

without question constitute an absolute statutory bar under 35 U.S.C. § 102(b) rendering the '292 patent invalid. This is so because a single unrestricted public use or sale brings into operation this bar to patentability. *Consolidated Fruit Jar v. Wright*, 94 U.S. 92, 94, 24 L.Ed. 68 (1876); *General Electric Co. v. United States*, 228 Ct.Cl. 192, 654 F.2d 55, 59 (1981); *In re Theis*, 610 F.2d 786, 791 (Cust. & Pat.App. 1979). Furthermore, the § 102(b) bar does not require the invention to be placed in public use or on sale by the patentee because such use or sale by a third party, with or without the consent of the inventor, is sufficient to invalidate any patent subsequently obtained if the use or sale occurred more than a year prior to issue. *Andrews v. Hovey*, 124 U.S. 694, 719, 8 S.Ct. 676, 686, 31 L.Ed. 557 (1888); *Hobbs v. United States*, 451 F.2d 849, 859-60 (5th Cir.1971); *O'Brien v. Westinghouse Elec. Co.*, 293 F.2d 1, 10 (3d Cir.1961); *Lorenz v. Colgate-Palmolive-Peet Co.*, 167 F.2d 423, 429 (3d Cir. 1948); *Noma Lites Canada Ltd. v. Westinghouse Elec. Corp.*, 399 F.Supp. 243, 253 (D.D.C.1975).

Indeed, Armak does not contest the factual or the legal basis of the public use and sale of the patented invention in 1972 as recited above. Rather, Armak contends that the public use and sales prior to the critical date of April 1, 1973, were completely justified under the "experimental use" doctrine first recognized by the Supreme Court in *City of Elizabeth v. American Nicholson Pavement Co.*, 97 U.S. 126, 24 L.Ed. 1000 (1878). Armak argues that the 1972 public uses and sales were made under a "temporary permit" issued under Environmental Protective Agency ("EPA") regulations⁶ which provided that such tempo-

5. While sales invoices were generated by Pennwalt at Tacoma, Washington; Montgomery, Alabama; Oakbrook, Illinois; and Bryan, Texas, all sales records for 1972 were destroyed except for the records found at Bryan, Texas (Tr. 944-45, 953).

6. The "temporary permit" regulations revised as of January 1, 1972 were issued under the authority of the Federal Insecticide, Fungicide, and Rodenticide Act ("FIFRA"), 7 U.S.C. § 135.

FIFRA as originally enacted in 1947 required that all pesticides shipped in interstate commerce be registered with the Secretary of the United States Department of Agriculture ("USDA"). In addition, the Food and Drug Administration ("FDA") set tolerances for those pesticides that might leave a residue on food crops. Authority over the regulation of pesticides under FIFRA was transferred from the USDA and the FDA to the EPA on December 2, 1970, by Reorganization Plan No. 3 of

rary permits "will be issued only for bona-fide experimental programs under the supervision of qualified persons" (TX 185; 40 C.F.R. § 162.17 revised as of 1/1/72). Thus, Armak contends that since the 1972 public uses and sales of Penncap M were made by Pennwalt under an EPA experimental use permit, then *ipso facto* these public uses and sales fall within the experimental use doctrine under the patent laws and are exceptions to the statutory bar of 35 U.S.C. § 102(b). The Court disagrees.

[8] The "experimental use" doctrine, developed under U.S. patent law as an exception to the statutory bar of § 102(b), is not co-extensive with, and does not have the same meaning as, "experimental use" of pesticides conducted under an EPA temporary permit issued under our environmental protection laws. Experimentation under U.S. patent law is based upon policy grounds and for purposes wholly unrelated to, and different from, the underlying policy reasons and purposes for experimentation under federal environmental legislation. Under the facts of this case, neither the public use nor sale of the patented invention before the critical date can be considered "experimental use" under § 102(b) even though the use and sales made in 1972 were permitted by an EPA temporary permit issued for "experimental use."

The pesticide control legislation, represented by FIFRA and FIFRA-1972, was the result of congressional recognition that appropriate pesticides properly used are beneficial to man and his environment and also that many pesticides constitute poisons too dangerous for any use, that some are dangerous to the health of man, animals, bees and other useful insects unless used extremely carefully. Thus, realizing that

1970, 35 Fed.Reg. 15623 (1970). On October 21, 1972, FIFRA was extensively amended by the Federal Environmental Pesticide Control Act, Pub.L. 92-516 ("FIFRA-1972"). FIFRA-1972 expanded the original FIFRA to cover pesticides in intrastate commerce and provided for the registration with the EPA of all pesticides to be distributed, sold or shipped, upon a showing that the pesticide warrants the claims

pesticides have important environmental effects, both beneficial and deleterious, the statutory scheme was adopted to vest wise regulatory control upon all pesticides based on a careful balancing of benefit versus risk to man and his environment. Hence, at that time these regulatory acts required all pesticides, with certain exceptions, to be registered with the EPA before they could be generally distributed, sold, shipped, delivered or received by anyone. The EPA was to approve the registration of a pesticide if it were determined that (1) the pesticide warrants the claims made for it, (2) its label complies with legislation, and (3) it will not have unreasonable adverse effects on the environment. The applicant had the burden of proving these elements by test data and other relevant information. See 7 U.S.C. § 135 (now repealed); Pub.L. No. 92-516; Legislative History of Pesticide Control, 3 U.S.Code Cong. & Ad.News, 92d Cong., 2d Sess. (1972) at 3993-4134. In addition, the EPA was given the authority to issue temporary permits (TX 185; 40 C.F.R. § 162.17 regulations as of 1/1/72) or "experimental use permits" (7 U.S.C. § 136a), to an applicant to gather information necessary to convince the EPA to register the pesticide for general use. Thus, this pesticide regulatory legislation prohibited the sale or shipment of all unregistered pesticides, whether patented or unpatented, unless they were transferred under a temporary EPA permit. The focus of these laws and regulations was to protect the environment and had nothing to do with experimentation for patent purposes.

On the other hand, the experimental use doctrine in patent law has been explained in *Paeco, Inc. v. Applied Moldings, Inc.*, 562 F.2d 870 (3d Cir.1977), as follows:

That doctrine allows an inventor a reasonable period of experimentation where-

made for it, its labeling complies with the Act, and it will not have unreasonable adverse effects upon the environment. In addition, the FIFRA-1972 provided that the EPA could issue "experimental use permits," if needed by an applicant to gather information in order to register the pesticide. (Pub.L. No. 92-516, Sections 3 & 5.)

in he may perfect his ideas, provided that the inventor truly has utilized the public use and sale to that laudable end, not as a competitive tool to exploit his invention and gain an advantage over others.

562 F.2d at 874.

[9] This means that the public use and on sale bar of § 102(b) can be extended for a reasonable period if the experimentation is undertaken to demonstrate the utility of the claimed invention and its lack of need for further improvement. *DeLong Corp. v. Raymond International, Inc.*, 622 F.2d 1135, 1144 (3d Cir.1980). The claims of the '292 patent in suit pertain to an insecticidal-concentrate composition. Pennwalt's activity under the EPA temporary permit was in no way necessary to demonstrate the composition's "utility and its lack of need for further refinement." The utility of the composition had already been demonstrated. Each of the six batches of Penncap M suspended in xanthan gum produced in 1972 passed the cricket bioassay test (PX 504; PX 544; Tr. 746-47), as well as Pennwalt's other two quality control tests for those batches (PX 544; Tr. 747-49). The success of xanthan gum had been established as early as November 8, 1971, when Pennwalt concluded that RD-4237 was "effective." (TX 134 at Bates 01602.)

[10] Furthermore, to allow federal regulatory laws to control the patent law meaning of "public use" or "on sale" would result in a haphazard operation of the Patent Office. (Tr. 1552.) The objectives of the EPA and the Patent Office differ. A use or sale labeled "experimental" by a government regulatory agency is not necessarily "experimental" under the patent laws. As stated before, a claimed invention may be complete under the patent laws while remaining experimental in the regulatory sense. In those few cases which focus on this issue they have indicated this difference. For example, *In re Hartop*, 311 F.2d 249, 257-60, 50 CCPA 780 (1962), held that the utility of a pharmaceutical invention sufficient to premise patentability does not depend on absolute proof of safety. Proof of reduction to practice of a pharmaceutical inven-

tion does not require Food and Drug Administration approval or proof of commercial marketability. *Campbell v. Wettstein*, 476 F.2d 642, 646 (Cust. & Pat.App.1973); *In re Anthony*, 414 F.2d 1383, 1396, 56 CCPA 1443 (1969). The mere fact that an electrical device was sold before Underwriters Laboratory approval does not avoid the statutory bar of § 102(b). *Interroyal Corp. v. Summons Co.*, 204 U.S.P.Q. 562, 565-66 (S.D.N.Y.1971).

Armak also contends that the data gathered by Pennwalt of field tests under the EPA temporary permit indicates experimentation under the patent laws. The Court is again unable to agree. The experimental data collected by Pennwalt under the EPA temporary permit consisted of the results of spraying Penncap M upon crops in the field. The Penncap M user diluted the claimed composition many times. For example, controlling oriental fruit moth on peaches, the Penncap M temporary label recommended 1-2 parts Penncap M to 400 parts water (TX 186C at Bates 05703). For the control of tomato worms, the label recommended 1 part Penncap M to 100 parts water. At 1:100 dilution, the concentration of xanthan gum sprayed by the field user is 0.003%, far below the lower limit claimed in the '292 patent. (TX 201.) Even at the minimum 1:5 dilution suggested for insecticide concentrates by Dr. Scher, Pennwalt's expert (Tr. 1084), the concentration of xanthan gum is only 0.06%, still below the '292 claims. Certainly, any "experimental use" by field users in 1972 was outside the claims of the '292 patent.

[11] It is well settled that experimentation to perfect non-claimed features of an invention does not fall within the experimental use exception to the § 102(b) bar. *In re Theis*, 610 F.2d 786, 791 (Cust. & Pat.App.1979); *Gould, Inc. v. United States*, 217 Ct.Cl. 167, 579 F.2d 571, 582 (1978); *Carborundum Co. v. Combustion Engineering, Inc.*, 505 F.Supp. 1011, 1020 (D.Del. 1981).

[12, 13] However, there are other factors in this case which indicate that the

public use and sales of the claimed composition in 1972 were not for experimental purposes under § 102(b). Armak shipped over 400 pounds of RD-4237 to Pennwalt in 1972 knowing that it would be used to suspend Penncap M according to the claims in the '292 patent. Every witness examined on the subject testified that Armak did not restrict in any way Pennwalt's use of the RD-4237. (Tr. 129-30; 355-56; 489; 618; 716; 831; PX 908 at 66; PX 901 at 92.) The absence of any restriction by the patentee on the uses of a patented invention is indicative of a non-experimental purpose. *Egbert v. Lippman*, 104 U.S. 333, 336, 26 L.Ed. 755 (1881). To avoid the on sale bar the inventor must show that the transferee lacked authority to use the invention or exploit its commercial value but where an inventor sells or delivers an invention to another without any enforceable obligation for the other to hold the invention for experimental purposes only, the unrestricted sale or delivery will invalidate the patent. *Kock v. Quaker Oats Co.*, 681 F.2d 649, 655 (9th Cir.1982), cert. denied, — U.S. —, 103 S.Ct. 787, 74 L.Ed.2d 994 (1983).

[14, 15] Another factor that is indicative of non-experimental purpose is the failure to require test reports. *Carborundum Co. v. Combustion Engineering, supra*, at 1020, 1027. The evidence in this case clearly demonstrates that Armak did not require Pennwalt to report back to it any results of its use of RD-4237 (Tr. 129, 489, 716, 813). Where a person has authority to use an invention commercially or sell to others without any duty to experiment further, there is a sale within the meaning of § 102(b) and the experiment exception does not apply. *Kock v. Quaker Oats Co.*, 681 F.2d at 656.

The evidence also clearly indicates that Pennwalt's primary motive in seeking an EPA temporary permit to ship 40,000 gals. of Penncap M between March and December, 1972 (TX 146), was commercial in order to recover part of its development expenses and to test the market (Tr. 1329). The temporary permit itself indicates that only 1.2% of the allotted 40,000 gals. was to be

supplied to researchers for the collection EPA data (TX 146; Tr. 1327-28).

Also, President Spooner of Agchem, a division of Pennwalt, advised the Pennwalt Executive Committee in 1972 that he was doing everything in his power to bring Penncap M to the market immediately (Tr. 677). It was Pennwalt's persistent objective to "make money" from sales under the EPA temporary permit, and to begin recapturing part of its research and development costs associated with Penncap M (Tr. 856, 1384). Manufacturing data from 1972 was also used to generate a cost-per-gallon figure (PX 711). Data collected under the temporary permit was used to set a sales price and gross marginal goal for Penncap M (TX 183 at Bates 04213; Tr. 637-38, 644-46). All of these activities demonstrate that Pennwalt was concentrating in 1972-1973 on the commercial aspects of Penncap M and did not involve any experimental aspects that would effect the on sale bar of § 102(b).

[16] It is well established that market testing and product introduction are not experimental uses. *Omark Industries, Inc. v. Carlton Co.*, 652 F.2d 783, 787 (9th Cir. 1980); *In re Theis, supra*, 610 F.2d at 793.

[17] A final factor indicates that the sales made in 1972 could not be considered experimental use to lift the bar of § 102(b). Pennwalt, not Armak, was the entity which caused the patented dispersion to be sold to Helene Chemical, Borden and Stauffer in 1972. The law is clear that the experimental use exception to the public use and on sale bar of § 102(b) applies to experiments of the inventor or persons under his control, not to third parties. *Magnetics, Inc. v. Arnold Engineering Co.*, 438 F.2d 72, 74 (7th Cir.1971); *Bird Provision Co. v. Owens Country Sausage, Inc.*, 379 F.Supp. 744, 747-48 (N.D.Tex.1974), *aff'd*, 563 F.2d 369 (5th Cir.1978). When the sales in question were made they were made by Pennwalt which was not under the control of Armak and even if Pennwalt's activities could be

considered experimental under patent law, they would not inure to Armak's benefit.⁷

Based on the evidence in this case, the Court finds that Pennwalt has demonstrated by clear and convincing evidence that the claimed invention was in public use and on sale in this country more than one year before the critical date of April 1, 1974. *Paeco, Inc. v. Applied Moldings, Inc.*, *supra*, 362 F.2d at 872. The Court also finds that Armak has failed to sustain its burden of showing that such uses and sales were for experimental, not commercial, purposes by a preponderance of the evidence much less by full, unequivocal and convincing evidence. *Smith & Griggs Mfg. Co. v. Sprague*, 123 U.S. 249, 264, 8 S.Ct. 122, 129, 31 L.Ed. 141 (1887).

Accordingly, the Court concludes the '292 patent is invalid because the patented invention was in public use and on sale more than one year before the critical date in violation of 35 U.S.C. § 102(b).⁸

II. ARMAK'S STATE LAW CLAIMS

As indicated earlier, Armak has asserted state law claims contending that Pennwalt is liable for its profiting from Nemeth's invention which it alleges was a trade secret from mid-1972, when Pennwalt adopted its use, to mid-1978, when the Nemeth patent issued. (D.I. 128, p. viii.) This liability is alleged to exist for the breach of the 1963 Product Development Agreement between the parties and/or the unauthorized use by Pennwalt of the then trade secret and/or the resulting unjust enrichment of Pennwalt from the use of the trade secret which was then confidential information. (*Id.*). Because of the ambivalence of the parties' conduct and actions with respect to their dealings in this matter, additional facts must be considered.

7. As will be discussed later, this was not a joint venture with Armak.

8. In view of the Court's finding of invalidity of the '292 patent based on 35 U.S.C. § 102(b), it is unnecessary to discuss Pennwalt's other grounds of invalidity.

1. Background Facts

Pennwalt entered the field of microencapsulation upon its acquisition of Wallace & Tiernan in 1969 and concentrated on encapsulated pesticides (Tr. 874-75). Methyl parathion was selected for encapsulation because its high toxicity would benefit from the toxicity reduction and slow release afforded by encapsulation (Tr. 875-76). Chester DeSavigny of Pennwalt was the inventor of Pennwalt's encapsulated methyl parathion product, Penncap M, which became the subject of U.S. Patent No. 3,959,464, issued May 25, 1976 (TX 166).

In May of 1970, Pennwalt's people recognized that Penncap M could not be used in the field in a water system without the addition of some suspending and/or emulsifying agents (PX 501; Tr. 1309) because the encapsulated material settled to the bottom and it was difficult to disperse it (TX 193, p. 38). Various persons at Pennwalt's facilities attempted to solve the suspension problem on a "hit or miss" approach but none were knowledgeable in formulation chemistry (Tr. 638-69; 1310; 1361-62), and the solution to the problem was without much success.

On February 4 and 16, 1971, Pennwalt's personnel, Obren Keckemet and Harry Culver, wrote to six companies for help in finding a suspending agent for Penncap M and sent them samples of unsuspended Penncap M: Woodbury Industries, Inc., Emery Industries, Inc., Retzloff Chemical Company, Witco Chemical Company, Inc., Atlas Chemical Industries, Inc., and Armour Industrial Chemical Company ("Armak") (TX 100). These companies were mostly surfactant⁹ suppliers (Tr. 1280). This request for technical assistance from other companies was consistent with Pennwalt's past practices (Tr. 1300; 1310) and was, and is, a common practice within the chemical industry to render technical or customer

9. A surfactant is a material which will move preferentially to the interface between oil and water phases, thereby lowering interfacial tension (Tr. 1075; 1077).

services when requested (Tr. 661-62; 770). Typically, a chemical supplier, at the request of a customer or potential customer, will analyze a customer's problem and suggest a specific material to be used with the customer's product free of charge (Tr. 716; 662; 1352; 1211). Well known as a selling tool, the technical service can develop sales of the supplier's material for use with the customer's product (Tr. 770; 716).

Pennwalt's request to Armak, as well as to the other five companies contacted, was for this customer service type of assistance. Pennwalt's request to Armak was directed to Dr. Walter W. Abramitis who was the Section Head of Armak's Agriculture Chemical Research and Pennwalt's contact with Armak in the agricultural chemical field (PX 901, p. 4; Tr. 1301). Part of Abramitis' duties for Armak was problem solving for customers, that is, "if a customer needed a specific product that he wanted, why, I would try to adapt our chemicals to his needs." (PX 901, p. 9.) Pennwalt had been since 1960 a customer of Armak buying hundreds of thousands of dollars annually of amides and surfactants (Tr. 682; 812).

When Culver of Pennwalt wrote to Abramitis on February 16, 1971 regarding Pennwalt's suspension problem, he specifically asked if Abramitis could "find a combination of those good Armour surfactants that will do the job." (TX 100.) Abramitis brought the problem to Sidney Shapiro, then assistant director of research for Armak (Tr. 196-98). Shapiro turned the problem over to Nemeth (Tr. 201; 66). Nemeth, on April 1, 1971, performed his first work in suspending the Penncap M samples received from Pennwalt (TX 103). Prior thereto, Armak had on hand a sample of "Kelzan" xanthan gum which had been ordered by Shapiro (Tr. 231). Kelzan had been used before by Armak as a thickener (Tr. 222).

Both Nemeth and Shapiro knew that gums were useful as suspension agents and Nemeth was led first to try Kelzan, an industrial grade xanthan gum, manufactured by Kelco Company (Tr. 97-100; 102; 253-54). Nemeth's April, 1971 experiment

required him to weigh out the suspending agent into Penncap M, stirring the mixture with an agitator at room temperature, and observing the results 24 hours later (Tr. 105-106). Nemeth performed additional work in August and September, 1971, screening additional possible suspending agents (TX 129), the result of which indicated that besides Kelzan xanthan gum, which showed the best results (TX 105), other gums also worked as suspending agents (PX 13, 18; Tr. 533-42).

Sometime shortly after April 28, 1971, formulations bearing "TD" code numbers designated by Abramitis were sent by Armak to Pennwalt (Tr. 207; TX 106). Pennwalt analyzed these formulations also with others submitted by other companies and those generated by Pennwalt. Boiled down to specifics, it appeared by November, 1971 to Pennwalt that Armak's submission as RD-4237 appeared to be "really effective" (TX 134). At no time did Armak disclose to Pennwalt the chemical identity of RD-4237 as xanthan gum (Tr. 254-55).

In October, 1971, Keckemet learned for the first time: (1) that Armak was "asking for some kind of money compensation" for Pennwalt's use of RD-4237 (Tr. 1357), (2) that Armak was "applying for a patent for this material as a suspending agent and tentatively they intend to charge us royalties of \$.07/gal., based on selling price of Penncap M if patent is issued, or \$.04/gal. if patent is not issued (this in addition to cost of material)," and (3) that Armak "will be buying this material from another company" (TX 3). Nothing, however, was apparently mentioned of royalties until later.

In 1971, Pennwalt began producing Penncap M in a pilot plant at Bryan, Texas, which produced 20-gallon size batches (Tr. 899, 734). At that time Sponto 176, a suspending-emulsifying agent supplied by Retzloff Chemical Co., was used in producing Penncap M (Tr. 1310). Keckemet testified that Pennwalt selected Sponto 176 over Armak's RD-4237 because Pennwalt had more experience with Sponto 176, test data indicated that it was biologically and toxicologically safe, and Pennwalt did not know

whether RD-4237 would be cleared by the EPA whereas Sponto 176 had been so cleared (Tr. 1308, 1309, 1339-40).

In March, 1972, a full sized production plant came on stream at Bryan, Texas, capable of producing 750 gallon batches (Tr. 898). The first full-size production batches of Penncap M used Sponto 176 but problems resulted: the Penncap M settled and became non-pourable and more seriously, the methyl parathion began leaching out of microcapsules into the surrounding aqueous phase (Tr. 935, 924). As a result of these problems during production, Pennwalt in July, 1972 stopped using Sponto 176 and switched to Armak's RD-4237 agent and the first batch so run was on July 18, 1972 (PX 508, Tr. 922-23; 936).

After July 18, 1972, all of Penncap M was produced using RD-4237 as the suspending agent and Armak had knowledge of this and indeed had shipped an additional 400 pounds in July and August, 1972 for these runs. (D.I. 99, ¶¶ 3.24 & 26.) It was then on August 4, 1972, that Roy deVries, Armak's Director of Marketing, wrote to Robert Toth, Agchem's newly appointed General Manager, suggesting that the parties "should sit down and come to some agreement on the terms under which we would be prepared to arrange this." (TX 18.) Toth responded that "he would confer with Pennwalt's technical and manufacturing people" and that "[w]e should sit down and discuss the agreement as soon as we determine the future of your product." (TX 19.) Toth testified he meant by "future of your product" from a business standpoint rather than a formulation standpoint. (Tr. 838.) Pennwalt was then beginning a "test marketing program" and it appeared to Toth that Armak knew that Pennwalt was using RD-4237 in that program. (Tr. 836-38.)

Next, on November 22, 1972, G.F. Smitskamp, Vice President of Armak, wrote to Toth raising three points: (1) a possible agreement on the suspending agent for Penncap M, (2) a possible agreement concerning third party investigations of unpatented products submitted by Armak to Pennwalt, and (3) when Armak should file

for foreign patent applications on Penncap M's suspending agent and whether Pennwalt would be willing to pay for the filings. (PX 540.) Toth responded on January 8, 1973 that the decision to file in foreign countries and the expense was up to Armak. (TX 25.) Toth testified that his response to the possibility of royalty payments in his letter to Smitskamp referred to possible royalty agreements in foreign countries if Pennwalt decided to market Penncap abroad. (Tr. 799-800.)

Toth met with Armak representatives on March 27, 1973, and expressed an unwillingness to discuss a royalty until Armak's patent status was determined (TX 28). Toth stated that, once Armak produced a patent for the suspending agent, he would forward it to Pennwalt's patent department for review (Tr. 801).

Smitskamp testified that during a telephone call he made to Toth on April 24, 1973, Toth agreed that any royalty agreement eventually reached would be retroactive to include all RD-4237 shipments beginning in April, 1973. (TX 29A; Tr. 457.) Smitskamp also testified he told Toth that if the royalty agreement was not made retroactive, the 300-pound shipment now on the loading dock would not be delivered to Pennwalt (Tr. 457). Toth recalled the conversation but not the threat to cut off the supply of RD-4237 or that he agreed to retroactivity of any future royalty agreement; he did recall telling Smitskamp that Penncap M was being test marketed to determine how the product was accepted at proper selling price. (Tr. 802.) Smitskamp offered to send a royalty agreement and Toth replied, "Fine send me an agreement, send us a draft, and we'll take a look at it." (Id.) Smitskamp sent Toth a confirmatory letter on April 25, 1973 stating, "we are proposing a royalty of 7% on the value of your finished product," that he appreciated Toth agreeing to the retroactive condition, and that he would submit a Licensing Agreement. (TX 29.) Toth never responded to this letter. (Tr. 846.)

On August 3, 1973, Kelco Company at Pennwalt's request reverse-engineered a

sample of Armak's RD-4237 and determined its identity to be xanthan gum that was well within the specification range of Kelzan¹⁰ (TX 31). The identity of RD-4237 was confirmed when Shapiro wrote to DeSavigny on June 18, 1974, confirming that Armak would supply Pennwalt with 6,000 pounds of RD-4237 at 600 pounds per month starting October 1, 1974, and by error included a shipping order to that letter which identified RD-4237 as Kelzan (PX 510).

In April 1974, Pennwalt received the draft royalty agreement from Armak which had been promised the year before. Toth expressed a willingness to buy xanthan gum from Armak under a resale agreement if Armak's price was competitive (Tr. 818-19; TX 42). Throughout 1974 Armak insisted its patent would issue and Toth maintained Pennwalt's position that there would be no negotiations until the patent issued and was reviewed by Pennwalt's patent department (Tr. 820-21; 841-42).

No further negotiations took place until President Spooner of Agchem met with Armak Vice President F.L. Linton on May 23, 1978, and for the first time Armak asserted that the Product Development Agreement ("PDA"), dated November 26, 1963 (TX 80), controlled the question of royalties for Pennwalt's use of RD-4237 (Tr. 648). Further negotiations were fruitless and this lawsuit was filed on March 26, 1979.

When Pennwalt learned independently of Armak that RD-4237 was Kelzan xanthan gum, Pennwalt elected to discontinue buying Kelzan from Armak. (D.I. 99, ¶ 3.23.)

2. The Product Development Agreement

The predecessors of Armak and Pennwalt began their cooperative efforts in the field of agricultural chemicals in the late 1950's (Tr. 404) and this eventually resulted in the execution of the PDA, dated November 26, 1963. (Tr. 407; TX 80.) The intent of the PDA was to complement the respective

strengths of the two companies as the recitals of the agreement show:

1. The purpose of this agreement is to establish a basis for cooperation between PENNSALT and ARMOUR and *the field for this cooperative effort shall be the development of pesticides*, to include, but not limited to, insecticides, fungicides, herbicides, rodenticides, plant growth regulators, nematocides, and harvest aid chemicals.

2. *ARMOUR has developed chemicals and formulations showing possible pesticidal activity* and is continuing research and formulation development on products of this type. It is desired to have these materials tested further in laboratory, greenhouse, and the field in order to develop said products to commercial usage.

3. PENNSALT has pesticide development personnel and facilities and desires to screen and test these chemicals and formulations for *pesticidal activity* for the purpose of developing additional pesticides which may be marketed by PENNSALT in the United States and in foreign countries.

(TX 80; emphasis added.)

Armak contends that the submission of RD-4237 (xanthan gum) to Pennwalt was pursuant to the PDA and thus Pennwalt is obligated to enter into a licensing agreement and pay royalties thereunder. Pennwalt's failure to do so, Armak argues, amounts to a breach of the PDA. Mr. Karl Bierman, a former Vice President of Armak, and Mr. Richard Reck, Armak's Director of Commercial Development, testified that it was their opinion and belief that the PDA clearly embraced Armak's submission of RD-4237. (Tr. 418-19; 501.) Their testimony is flatly contradicted by the testimony and other witnesses which will be hereinafter discussed.

[18] Faced with such contradictory testimony, courts turn, as an important aid to the construction of a contract, to examine

10. In November and December, 1972, DeSavigny, reporting on a study he made of suspending agents, came to the belief that RD-4237 was xanthan gum because it behaved in physical

characteristics as General Mills XB23 and Kelzan which he had tested and knew were xanthan gums (PX 522; Tr. 955-56).

the practical construction placed on the agreement by the parties themselves. *American Bemberg Corp. v. United States*, 150 F.Supp. 355, 361 (D.Del.1957), *aff'd*, 253 F.2d 691 (3d Cir.), *cert. denied*, 358 U.S. 827, 79 S.Ct. 45, 3 L.Ed.2d 67 (1958); see *Canister Co. v. National-Can Corp.*, 71 F.Supp. 49, 50 (D.Del.1946), where Judge Leahy adopted the wisdom of Lord Chancellor Sugden in *Attorney General v. Drummond*, 1 Drury & Warren 353, 368, "Tell me what you have done under a deed, and I will tell you what that deed means." This advice is particularly applicable to this case.

First, the above recitals of the PDA refer to Armak's submission of an *active* pesticide or to the submission of an Armak chemical which *chemically reacted* with a Pennwalt compound to create an active pesticide. Here the submission was xanthan gum which is an "adjuvant"—an inert ingredient in a pesticide formulation which improves the physical characteristics of the formulation, but does not react chemically with other components of the formulation. (PX 908 at 61-62; PX 901 at 19; Tr. 216, 220.)

Second, the first license agreement between Pennwalt and Armak which arose under the PDA related to an amine-endothall salt. (TX 67.) Pennwalt's endothall herbicide was chemically reacted with Armak's patented amine, resulting in herbicidal salt which produced a more active product than Pennwalt's endothall herbicide. (Tr. 508, 688.)

Third, the amine-endothall license agreement was premised on Armak's patent or pending patent applications and absent the patent, Pennwalt would not have entered into the license agreement (Tr. 694-96). All later submissions of Armak under the PDA included *active pesticides* and each agreement arising therefrom was in the form of a patent license (Tr. 686-87). No licensing agreements between Pennwalt and Armak were ever directed to inert substances and Pennwalt never paid a royalty to Armak for an inert adjuvant (Tr. 687; PX 901 at 38).

Fourth, from 1972 through 1974, Smitskamp, Armak's Vice President, was actively

seeking Pennwalt's agreement to pay a royalty on RD-4237, but at no time did anyone at Armak refer to the PDA as a basis for such an agreement (Tr. 488-89). It was not until after Linton became Vice President of Armak's Chemical Division and on May 23, 1978, that the PDA was ever mentioned with respect to RD-4237 (Tr. 648).

Fifth, another indication that the parties did not believe the PDA was applicable to RD-4237 is the fact that Section 4 of the PDA was not followed by Armak. Section 4 provides, in part:

Each company will keep its own invention records and seek its own patents, *and will keep the other party fully informed of the patent application status* of each of its inventions relating to pesticide chemicals covered by this agreement.

(TX 80; emphasis added.)

In 1965, patent counsel for the parties reached an understanding as to how the parties would operate under this provision; Armak was to furnish drafts of Armak's patent applications to Pennwalt for comment before filing in the Patent Office. (PX 513 & 515.) However, no part of three Nemeth patent applications leading to the '292 patent were ever revealed to Pennwalt, apart from the allowed claims of the issued patent in 1978 (Tr. 654-55). Had Armak believed that the PDA covered RD-4237, the three applications would have been submitted to Pennwalt before filing.

Finally, Section 3 of the PDA required Armak to release to Pennwalt the identity of all material submitted for testing upon request of Pennwalt. That provision reads:

SECTION 3—LIMITATIONS

1. ARMOUR will release the chemical identification of compounds or other data on materials when submitted to PENNSALT for testing in accordance with Secrecy Agreement Letter dated February 17, 1961 [TX-70] and the supplemental letter of March 30, 1961 [TX-72] from L.M. Miller of ARMOUR to J.D. Watson of PENNSALT.

Although repeated requests by Pennwalt were made, Armak never revealed the identity of "RD-4237." Pennwalt asked Abramitis of Armak for the identity of RD-4237 on the following occasions: May 3, 1971 (TX 109); August 2, 1971 (TX 177); November 3, 1971 (TX 8); and during a November, 1972 meeting in Tacoma, Washington (TX 21 at Bates A006229; Toth 794-95). According to the testimony of Armak's witness Bierman, if RD-4237 was covered by the PDA, its identity should have been disclosed to Pennwalt. (Tr. 432-33.) This is simply another example of Armak's conduct which leads to the conclusion that PDA did not apply to RD-4237.

[19] Accordingly, having considered and weighed the testimony of the witnesses, the documentary evidence, and the conduct of the parties, the Court concludes that RD-4237 (xanthan gum—an inert adjuvant) was not within the scope of PDA and therefore the PDA affords no basis for holding Pennwalt liable for damages for breach of express contract.

3. *Implied Contract or Unjust Enrichment*

[20] Armak contends that it is entitled to a finding that Pennwalt is liable to it upon either of two alternative theories: (1) breach of contract implied from the unauthorized use of its trade secret, or (2) unauthorized use of its trade secret unjustly enriching Pennwalt.

The difficulty in applying these two theories to this case is the lack of proof by Armak of a factual basis necessary to support those theories.

The Court is convinced by the credible evidence that on February 16, 1971, when Pennwalt first requested Abramitis of Armak, as well as the other five chemical companies, for help in solving Penncap M's dispersion problem, it was seeking free technical or customer services. This was a common practice in the chemical industry. Pennwalt had been a long time customer of Armak and it hoped that Armak's "good surfactants" could solve its dispersion problem with Penncap M. Pennwalt believed

that Armak would benefit by its sales to Pennwalt. Indeed, Armak provided customer services regularly to others. Nemeth, who spent about one-half of his time between 1966 through 1979 on technical services activities (Tr. 101), never knew of an occasion when Armak attempted to charge a customer for technical services except for RD-4237. Shapiro, Nemeth's superior, testified that technical or customer services were usually compensated by sale of their products (Tr. 214-15; 218). Abramitis handled between 5 to 10 technical service requests a year during his 30-year tenure with Armak and he never once charged for such services or was aware of charges by Armak for such service to customers. (PX 901 at 10.)

Furthermore, when Armak shipped the coded samples of xanthan gum-suspended Penncap M to Pennwalt on April 28, 1971, Armak never indicated that compensation was expected, never placed any restrictions or controls over the use or disclosure of the materials, and never indicated that Armak was establishing some kind of confidential relationship with Pennwalt with respect to its request for help. Indeed, Armak remained silent in this regard while Pennwalt tested the samples, acquired more RD-4237 from Armak, and voluntarily reported back the "good results" in June 1971. While it is true, that the identity of RD-4237 was not revealed at that time or any other time intentionally by Armak, the purpose and use of the material was certainly disclosed because it was prepared and shipped in response to Pennwalt's request for specific technical services. The "benefit" conferred on Pennwalt and the "service performed" by Armak was completed when Pennwalt was sent the dispersion material on April 28, 1971. An uncommunicated expectation of remuneration at the time services are performed does not give rise to an implied or quasi-contract when Pennwalt had no reason to believe that compensation was expected for that service. See *Bloomgarden v. Coyer*, 479 F.2d 201, 202 (D.C.Cir. 1973).

Equally important is the fact that in April, 1971 Armak did not indicate that by responding to Pennwalt's request for customer service, Armak was attempting to establish a confidential relationship. If this was Armak's intent, it should have put its customer Pennwalt on notice of this condition. The Court is convinced that Armak did not do so at that time because it considered its help to Pennwalt to be free customer service. It was not until October, 1971, as a complete afterthought, that Armak decided to file a patent application and tentatively to seek some form of royalty (TX 3).

After Pennwalt began to manufacture and sell larger batches of Penncap M suspended in RD-4237 in July and August, 1972, of which Armak was aware (TX 22) having shipped an additional 400 pounds to Pennwalt at Bryan, Texas, and it having appeared that Penncap M would have an excellent commercial future, Armak then began to agitate for an agreement with Pennwalt for the payment of royalties. Apparently, Armak, through Smitskamp and Linton, was seeking an Aronson-type contract [see *Aronson v. Quick Point Pencil Co.*, 440 U.S. 257, 99 S.Ct. 1096, 59 L.Ed.2d 296 (1979)], whereby Pennwalt would agree to pay certain royalties if a patent issued to Armak and lower royalties if a patent did not issue, and to pay such royalties retroactive to April, 1973. These specific requests for royalties caused Pennwalt to take the position, which it has consistently maintained ever since, that it would only pay royalties if Armak obtained a valid patent on Penncap M's suspending agent.

These conflicting positions of the parties do not give rise to any expressed or implied contract to pay royalties for services which the parties originally considered and treated as ordinary free customer services.

In any event, even the identity of RD-4237 was no longer a secret after August 3, 1973. At that time, Kelco Company by reverse engineering had determined at

Pennwalt's request that RD-4237 was xanthan gum and probably Kelco's own Kelzan (TX 31). Trade secret law, even if it were applicable here, does not afford protection against discovery by fair and honest means, such as independent invention, accidental disclosure or reverse engineering. *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 474, 94 S.Ct. 1879, 1882, 4 L.Ed.2d 315 (1974).

Moreover, on the proof adduced in this case, no confidential relationship existed between the parties on the RD-4237 issue. Their relationship with respect to RD-4237 began with a customer's request for technical services from a supplier. The technical services were given to Pennwalt without restrictions on its use or disclosure, nor was it stated to be in confidence. Thus, the Court finds that the necessary elements for a recovery against Pennwalt based on a trade secret has not been demonstrated. The Court therefore concludes that Armak has not established Pennwalt's liability on the theory of breach of implied contract or unjust enrichment.¹¹

III. ATTORNEY'S FEES

Pennwalt, in seeking reasonable attorney's fees on the basis that this is an "exceptional" case within the meaning of 35 U.S.C. § 285, advances two grounds: (1) Armak successfully opposed Pennwalt's summary judgment motion thereby forcing Pennwalt to incur far larger attorney's fees in proceeding with a bench trial than would have resulted if it had been disposed of by summary judgment, and (2) Armak intentionally practiced fraud upon the Patent Office during the prosecution of the three patent applications leading to the issuance of the '292 patent.

[21] First, the Court finds no merit to Pennwalt's first ground. There were genuine issues of material fact in dispute which could not be resolved by summary judgment thereby requiring a bench trial to resolve the disputed facts. The Court can-

11. Because of this ruling, it is unnecessary for the Court to pass on Pennwalt's affirmative defenses that Armak's state law claims are

barred by the statute of limitations, and doctrine of laches, waiver and estoppel.

not attribute bad faith to Armak for opposing plaintiff's summary judgment motion.

Judgment will be entered in accordance with this opinion.

[22] Second, the Court has found the '292 patent to be invalid under the "in public use" and "on sale" bar of 35 U.S.C. § 102(b). It has also intentionally refrained from passing on all of Pennwalt's claims that the '292 patent is unenforceable on the ground that fraud was practiced on the Patent Office. The Court sees no need to "beat a dead horse to death" in order to determine that the '292 patent already found to be invalid is also unenforceable because of fraud. Therefore, without specifically deciding whether all of Armak's alleged acts amounted to fraud, the Court does find that the prosecution of the three patent applications leading to the '292 patent leaves much to be desired and that the conduct of Armak before the Patent Office was less than candid. The fact that this Court has invalidated the patent based on the statutory bar of § 102(b) creates the suspicion that had the relevant facts been disclosed in the beginning, the Patent Examiner would not have issued the patent. However, Armak has made a showing that it sincerely believed that the "experimental use" under the federal environmental laws could be equated with "experimental use" under the patent laws so as to take the case out of the § 102(b) bar. While this bona fide belief, which was not disclosed to the Patent Office, falls short of standards required for patent practice, nevertheless, it was sufficient to support a good faith belief in the patent's validity. Consequently, based on this finding, the Court, in the exercise of its discretion, holds that this case is not "exceptional" for the purpose of requiring Armak to pay Pennwalt's attorney's fees under 35 U.S.C. § 285. See *Union Carbide Corp. v. Borg-Warner Corp.*, 550 F.2d 355, 362-63 (6th Cir.1977); *Indiana General Corp. v. Krystinel Corp.*, 421 F.2d 1023, 1033-34 (2d Cir.1970), cert. denied, 398 U.S. 928, 90 S.Ct. 1820, 26 L.Ed.2d 91 (1970).

This opinion shall constitute the Court's findings of fact and conclusions of law required by Rule 52(a), Fed.R.Civ.P.



Frances E. BELL

v.

John C. BRENNAN, et al.

Civ. A. No. 83-1185.

United States District Court,
E.D. Pennsylvania.

Aug. 22, 1983.

Civil rights action was brought. Defendants moved to dismiss. The District Court, Giles, J., held that complaint alleging that plaintiff was erroneously issued citation for reckless driving after being involved in collision with automobile being driven by police officer failed to state claim for relief under federal civil rights law.

Motion granted.

1. Civil Rights ⇐ 13.12(5)

Count in complaint alleging that plaintiff was erroneously issued citation for reckless driving after being involved in collision with automobile being driven by police officer failed to state claim for relief under statute prohibiting discrimination based upon race where there was no allegation that plaintiff was treated unfairly and unequally on account of her race. 42 U.S.C.A. § 1981.

2. Civil Rights ⇐ 13.12(7, 8)

Valid cause of action under section 1983 is not made out simply by asserting that common-law tort was committed by state official; rather, plaintiff must allege deprivation of some constitutional right under color of law. 42 U.S.C.A. § 1983.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Reissue Application of:

BILL L. DAVIS and JESSE S. WILLIAMSON

For Reissue of U. S. Patent 5,630,363

Issued May 20, 1997

Serial No. 08/515,097

Filing Date: May 20, 1999

Serial No.: 09/315,796

For: **COMBINED LITHOGRAPHIC/
FLEXOGRAPHIC PRINTING
APPARATUS AND PROCESS**

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§ Group Art Unit: 2854
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§ Examiner: S. Funk
§ J. Hilten
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**JOINT DECLARATION (1) UNDER 37 C.F.R. §1.131
and (2) PERTAINING TO DERIVATION BY DeMOORE AND
PRINTING RESEARCH, INC. OF REISSUE APPLICANTS' INVENTION**

TO: The Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231

SIR,

The undersigned reissue applicants, (1) Bill L. Davis, residing at 1126 Tipton Road, Irving, Texas 75060; and (2) Jesse S. Williamson, residing at 5728 Caruth, Dallas, Texas 75298, and both being United States citizens, declare that:

1. We are the same joint declarants of a REISSUE DECLARATION executed on or about May 20, 1999, and of a SUPPLEMENTAL REISSUE DECLARATION executed March 9, 2000, and wish again to reaffirm our affirmation that we believe ourselves to be the original, first and joint inventors of the invention described and claimed, and of the invention and discovery described, in United States Patent No. 4,630,363, for which we seek reissue. We also executed a Joint Declaration Under 37 C.F.R. §1.57(b) on May 20, 1999 ("the Rule 57 declaration").

2. We have reviewed the Office Action dated February 8, 2000, mailed February 9, 2000 and note the Examiner's rejection of Claims 1-6, 9-20, 22-25 and 28-38 (Office Action at page 7) allegedly as anticipated under 35 U.S.C. §102(e) in view of DeMoore et al., U.S. Patent No. 5,960,713 and of Claims 7-8, 21, 26, 27 and 39-87 (Office Action page 8) under 35 U.S.C. §103(a) as allegedly obvious over the same DeMoore et al. We filed an Amendment under 37 C.F.R. §1.111 on April 7, 2000 and wish again to note our beliefs as we stated in said Amendment that DeMoore et al's '713 patent is one of three issued U.S. patents all based on a common specification filed October 2, 1995. and that DeMoore's specification Serial No. 08/435,798 is radically different, having different description of the invention and different

figures than the '713 patent, so that DeMoore et al. cannot be entitled to the May 4, 1995 filing date of Serial No. 08/435,798. We believe any fair examination of Serial No. 08/435,798 by one of ordinary skill in the art will lead said artisan to the conclusion that Serial No. 08/435,798 does not describe nor provide an enabling teaching of any of the claims of the '713 patent and therefore cannot place the artisan in possession of the '713 claimed invention. The '713 patent is a semi-permanent conversion of an offset lithographic printing press for flexographic production. This non-retractable unit applies coating to a flexographic plate mounted on either the plate or blanket cylinder of an offset lithographic printing press for direct or indirect (offset) flexography. The '713 patent does not use a cantilevered device as shown in Serial 08/435,798 or any other retractable mechanism and, in fact, teaches away from Serial 08/435,798. We also wish to note REISSUE APPLICANTS' MEMORANDUM CONCERNING THE PRIOR ART AND THEIR POSITION ON PATENTABILITY (the "MEMORANDUM") and the attached declarations thereto of Baker, Bird (two declarations), Brown and Garner.

3. As corroborated by the Declaration (attached to the MEMORANDUM) of former PRI salesman Steve Baker, executed November 3, 1999 and paragraphs 5-8 thereof, we met with Steve Baker at an Atlanta restaurant (Morton's Steakhouse) in the late evening on a Sunday in late July, 1994 and disclosed to him the broad aspects of our invention to-wit, that Williamson Printing Corporation's ("WPC's") proprietary "WIMS" process (now U.S. pat. 5,370,976) could be improved by employing flexography at a printing station we designated as "upstream" of one or more printing stations of an offset lithographic press that we would receive from Heidelberger Druckmaschinen A.G. ("Heidelberger").

4. In fact, we had first conceived of this process upon the return of Jesse Williamson to the United States from Germany in late May, 1992. The conception was inspired -- at least in part -- by Jesse Williamson's observation of printing with an anilox roller at the coating tower at the plant of M.A.N. - Roland in Offenbach, Germany in late May 1992. In later '92 or early '93, WPC undertook a lengthy study to determine what presses WPC would purchase to replace its existing outdated presses. Until this study was completed and new presses were installed, it was not practical to reduce to practice our '363 process. As of the time of the restaurant meeting with Baker, we had then just returned from Germany and had already reached an oral agreement that WPC would purchase a number of offset lithographic presses from Heidelberg's United States subsidiary, Heidelberg U.S.A. ("Heidelberg").

5. As of the time of the July 1994 meeting, WPC, reissue applicants' assignee had settled a lawsuit with Steve Baker's then employer, Printing Research Corporation ("PRI"). Part of the settlement involved an obligation on the part of WPC to buy an agreed dollar amount of equipment and/or supplies from PRI. WPC had committed in early August 1994 to purchase dryer equipment from PRI for a line of Heidelberg printing presses to be installed at WPC starting in late 1994 running well into 1995. In fact, as part of the Atlanta trip, of the undersigned, Jesse Williamson was shown by Steve Baker a PRI-constructed HV interstation

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drier at a local carton printer manufacturer in the Atlanta area. The undersigned reissue applicants also disclosed to Steve Baker WPC's proprietary "WIMS" process - later to become U.S. Pat. 5,370,976 - concerning the printing of metallic inks. We informed Steve Baker that a patent application was pending concerning the "WIMS" process. We showed Steve Baker some Rolex watch advertisements that were part of some jewelry catalogues that were printed by the WIMS '976 process. Jesse Williamson picked up the bill for dinner, even though Steve Baker was the salesman trying to sell WPC equipment.

6. We told Steve Baker at the Atlanta restaurant that we had conceived an invention to improve the WIMS process to make the metallic inks printed appear even more brilliant. As stated above, we told Steve Baker that we wanted to use flexography at a printing station we designated "upstream" - perhaps even the first station --- of one or more printing stations of an offset lithographic press that WPC would receive from Heidelberg. We mentioned several ways in which this could be done --- by a dedicated flexographic station which would replace an existing lithographic station, by a bolt-on manually added (like a "T-head", modified) device that would be used on a run-by-run basis, or a retractable or "rack-back" mechanism sold in the trade, which would have to be modified for "upstream" use. We mentioned that with respect to the rack-back option, that we would have like a retractable mechanism with an anilox roller and a chambered doctor. We would employ state-of-the-art flexographic plates. We mentioned that we had seen the use of some of these flexographic plates in Germany in late May 1992 and again in July 1994 and that a number of companies sold high-resolution plates which would work in our new process. We asked Steve Baker whether or not PRI was interested in supplying these types of rack-back or retractable devices. Steve Baker told us that PRI had available for modification an end-of-press rack-back, not dissimilar to (a) Dahlgren International's end-of-press device currently sold and (b) other devices which were sold by PRI's competitors. We were told PRI's rack-back was developed by PRI employee, John Bird, when John Bird was employed previously at another company in the eastern part of the United States. We had seen rack-back literature as of 1994 from a number of companies, including Dahlgren, Oxy-Dry, IBC, Rapidac, IVT, Epic, and PRI. Dahlgren had sold rack-backs for many years with anilox rollers, and on request, supplied a chambered doctor to units ordered. Any one of a number of rack-back vendors could have easily altered their end-of-press rack backs to make same an interstation device as of 1994.

7. We indicated to Steve Baker that we wanted to run some tests at Printing Research using the retractable equipment which might be modified for interstation use. These tests - conducted for WPC occurred later in 1994, specifically in October and December, as we recall. The tests concerned spot coating of selected images, including the application of metallics (our specialty in view of WIMS '976), opaque colors and encapsulated essences, as well as the evaluation of the resolution of flexographic plates. From approximately August to early October 1994, we investigated several flexographic plate manufacturers (DuPont, BASF and W.R. Grace

(Polyfibrone)) that supplied WPC with the flexographic plate technology used in the October and December 1994 tests at PRI. The plates were made at Chicago Lithoplate and Wilson Engraving using raw plate materials supplied by the manufacturers and negatives supplied by WPC. For these tests at PRI, we supplied the substrates, the flexographic plates, the subject matter for the plates (selected films from previous jobs), and the flexographic inks and coatings. The tests were conducted at PRI at Bill Davis' direction. The December 1994 tests continued the October tests, and were also under Bill Davis' direction. We had much earlier, in our July 1994 trip to Germany, begun our investigation of the manufacture of flexographic printing plates, which included, in due course, discussions with the foregoing plate manufacturers.

8. In a series of meetings and conferences, which started on or about August 18, 1994, we conveyed to John Bird details of the '363 process we wanted implemented by a modified "rack-back" device to go "upstream", together with these tests we wanted run in the fall of 1994 using the 2-color press at PRI. Specifically, among other things, we disclosed to Bird (a) the resolution requirements for flexographic plates for our process, (b) requirements for anilox rollers, including line screening count ranges and minimums, and the availability of anilox rollers having desired features, (c) the WIMS '976 process (now U.S. Patent 5,370,976), (d) the problems with the printing of metallic/whites/opaque/encapsulated essences/and various other coatings with WIMS '976, (e) our desire that the flexographic plates be mounted to the blanket cylinder, (f) our uses of and requirements for flexographic inks and coatings, (g) half-tone printing, and (h) drying requirements for the new process. These matters were discussed in various meetings with Bird starting in August 1994 and proceeding through very late 1994 into early 1995. We notice in a review of the application filed as Serial No. 08/435,798 and its European equivalent EP 741,025 (A2) that the process aspects of this application filed in the name of three PRI employees, including Bird, discloses process features we told Baker and Bird from July 1994 through the end of 1994. We do not believe that any of the important process aspects taught in the PRI application pertaining to the '363 claimed invention originated with anyone other than the undersigned, through Bird and Baker. PRI derived the process aspects of their May 4, 1995 priority patent application from us.

9. As stated, Bill Davis conducted and supervised the fall 1994 tests at PRI using flexographic plates, inks and coatings supplied by WPC. WPC did not enter into a formal written understanding committing PRI to build for us any rack-back devices of any type prior to February, 1995, after we returned from Germany in January 1995, where we successfully simulated the '363 process, although we told PRI and Baker (and later Bird) from July 1994 forward that PRI would be in the running for the business if PRI made such an interstation device.

10. We were never told at any time prior to early 1999 by anyone at PRI that anyone at PRI thought some PRI employee had conceived the '363 process. We clearly came up with the process, as is corroborated by the Baker and Bird declarations. We even informed WPC's

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Chairman, Jerry Williamson, of some of the prospective advantages of the process. Note the internal memorandum of November 18, 1994, paragraph no. 6 on page one, the first document of group **Exhibit A**, and a later memorandum dated December 16, 1994, item two.

11. Starting in the late summer of 1994, we had a parallel track we were pursuing concerning the development of our invention as we did not know whether PRI would perform, wanted to perform, or would be price competitive with a modified rack-back. We had disclosed the invention to Heidelberg U.S.A.'s salesman Scott Brown no later than August 5, 1994 - flexography being performed first followed by offset lithography, all in one pass. We explained, as we had done to Steve Baker, the various options of having this done, e.g., a dedicated station, a mounted unit, or an auxiliary retractable unit. We explained to Scott Brown that we wanted a simulation of the invention (flexography printed first followed by lithography in a second pass), and Heidelberger originally scheduled the simulations the week of December 10, 1994. See **Exhibits B and C**. Because of the holidays, this simulation was rescheduled for January 20-21, 1995. The tests were carefully planned. (**Exhibit J**). BASF supplied the flexographic plate making equipment for our tests in Germany, even sent WPC a proposal in the first part of October, 1994. (**Exhibit D**)

12. On January 20-21, 1995 the first simulated reductions took place in Germany. The day-long tests on January 20, 1995 involved comparisons of the results of the new WIMS improved process (or "WIMS II") over the old process and involved rerunning some established WPC advertisements made for Rolex, some art work involving a 1957 Chevrolet bumper grill, an apple of some configuration, a memorable portion of an automobile brochure comprising a silver Lexus driving on a wet cobblestone road (having a shimmery look with a gold reflection off of puddles on the cobblestone), and finally some test-type patterns, to be run through the press, first with one or more flexography runs using an anilox roller and the BASF flexographic plates obtained for us at our request from Scott Brown of Heidelberg U.S.A., and followed up by offset lithography. With respect to the Lexus brochure portion, the multiple hues of the gold and silver metallic, blended with the natural wet cobblestones, were most impressive. The tests took all day from early in the morning until well after dark, and continued the next day. We directed the work of the German Heidelberger Drucksmaschinen A.G. technicians. There was unusual brilliance for the metallic inks involved, and without distortion. Several hundred impressions were printed, and sent through the presses in multiple passes, with the flexography step being done first, as the anilox roller existed end-of-press on the coating tower. The second day, January 21, 1995, involved more tests. The results - especially comparing the older results of the WIMS process with the new, improved process were very, very impressive - the enhanced brilliance of the metallic colors in the Rolex advertisement and the Lexus brochure were especially memorable, as the impressions had a sheen that was clearly of more brilliance than the older WIMS counterpart impressions. Note a copy of one of the first Rolex advertisement sheets produced by a simulation of the invention, **Exhibit E**. No one attended the tests from PRI, but

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of WPC's newly arrived six-color press. This first interstation device was the subject of a second confirmatory letter, dated May 12, 1995, from Bird to Jerry Williamson, which gave ninety (90) days for completion. The interstation device was actually installed on the first station of WPC's six-color press in late August or early September 1995, as noted in paragraph 15 above. Fifth, we first informed Steve Baker and PRI of our invention, as indicated above in paragraphs 5-6, in July 1994, and the details of the invention to Bird of PRI, as noted in paragraphs 8-9, in the fall of 1994.

20. The errors in the Rule 57 declaration statement quoted above in paragraph 19 were made inadvertently and without deceptive intent. The reasons for the errors in the above statement are that the Rule 57 declaration was prepared as part of the reissue papers in a short time period of four days prior to and including May 20, 1999, we did not have the opportunity to review all of the relevant 1994 and 1995 documents from our files relating to this matter before execution of the declaration and John Bird's letter of February 16, 1995, which was reviewed by us and was the first correspondence from PRI relating to construction of the interstation flexographic printer/coater by PRI, contained several errors, which we believe were unintentional and inadvertent.

21. In addition to the aforesaid errors, a number of errors pertaining to dates exist in the Rule 57 declaration. In paragraph 1, there is an indication that "in approximately June 1994", WPC ordered several presses from Heidelberg Drucksmaschinen A.G. True, an oral commitment was made in June between WPC and Heidelberger, but written confirmation did not occur until August, 1994. This error was made inadvertently, and without deceptive intent. We did not have the opportunity to review our corporate employer's files or our personal files when we executed the Rule 57 declaration on May 20, 1999. A similar date error as to the purchase of new press equipment occurred in the first sentence of paragraph 4, likewise made inadvertently and without deceptive intent.

22. Still other date errors occurred in paragraph 1 of the Rule 57 declaration:

"One of these presses, a seven-color press with a tower coater (the seven-color press") was installed at Williamson Printing in approximately October 1994 ... In approximately October-November 1994, Printing Research demonstrated to Petitioner's its end-of-press anilox coating system, known as the plate blanket coater."

The installation of the press identified was started in September 1994, not October 1994. Additionally, tests at PRI were conducted in October 1994 and December 1994, but under WPC's direction and control, as noted above in paragraph 9. Such errors in our Rule 57 declaration were made inadvertently and without deceptive intent.

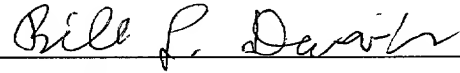
23. Likewise, another date error occurred at the end of paragraph 3 of the Rule 57 declaration:

"The only correspondence we can find between Williamson Printing Corporation and Printing Research, Inc. after Exhibit 1, and prior to installation of the interstation printer/coater, is attached hereto as Exhibit 2."

After a chance to review WPC's and our own records, we found Bird's proposal of May 12, 1995, **Exhibit G**, and an assortment of documents pertaining to negotiations between the parties, **Group Exhibit K**. This is strictly an error in dates, as we previously declared that the first interstation unit was delivered in mid-March, 1995 (see Rule 57 declaration, paragraph 5 discussed above), when the first interstation unit was actually delivered in late August 1995 or early September 1995. See paragraph 15 above.

Other than the errors noted above, the remainder of the comments in the Rule 57 declaration not inconsistent with the statements made in this declaration after a review of our documents, we reaffirm as we still believe they are true and correct.

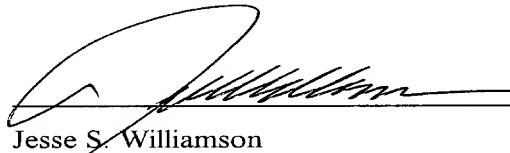
The undersigned Declarants state that all statements made herein of Declarants' own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.



Bill L. Davis



Date



Jesse S. Williamson



Date

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Reissue Application of:
BILL L. DAVIS and JESSE S. WILLIAMSON
For Reissue of U. S. Patent 5,630,393
Issued May 20, 1997
Serial No. 08/515,097
Filing Date: May 20, 1999
Serial No: 09/315,796
For: COMBINED LITHOGRAPHIC/
FLEXOGRAPHIC PRINTING
APPARATUS AND PROCESS

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SECOND SUPPLEMENTAL DECLARATION OF RAYMOND J. PRINCE

I, Raymond J. Prince, under penalties of perjury declare and state the following:

1. I am the same Raymond J. Prince who made a declaration on or about May 19, 1999 submitted with the original application for reissue, and a supplemental declaration dated March 15, 2000. I reaffirm each of the statements made therein.

2. I have been asked to review once again U. S. Patent 5,360,363, specifically in reference to an office action in reissue application Serial No. 09/315,796, as well as European Patent Application EP 741 025 - (A2) cited in that office action dated February 8, 2000, and give my opinion as to the '363's teachings to one of ordinary skill in the printing arts and respond to specific questions concerning (1) additional explanation of the word "over" as it relates to the step of "perfecting" in the printing arts and (2) the meaning of the statement "continuous in-line process." Finally, I have been asked to study U.S. patent application Serial No. 08/435/798 as filed on May 4, 1995 (European Patent Office published counterpart EP 741,025A2) and ascertain if claims 1-26 of U.S. Pat. 5,960,713 or any of them find fair support in Serial No. 08/435,798 and are described in that application.

3. As explained in the March supplemental declaration, the word "over" has several meanings, and one of the meanings is, clearly, "perfecting". As of August 1995, the word "perfecting" meant to print on both sides of the sheet in one pass through the press. Note also, the attached article (**Exhibit A** hereto), the "Toth Article" written in March of

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1995 for the publication Graphic Arts Monthly by senior writer Deborah Toth, and specifically, the underlined portions on pages 2 and 7. Deborah Toth is one of the most respected writers of Graphic Arts Monthly, an important journal in the field. The Toth article indicates that presses that have eight units with a "perfecting" unit between units 4 and 5 are referred to as a "4-over-4" perfector. The word "over" and "perfector" in this case are synonymous. A sheet that has 5 colors on one side and one color on the other, and is produced in one pass, would be referred to as a "5 over 1" press, i.e., a "perfecting press".

4. *Based on the usual and ordinary meaning of the terms "continuous process" and "in-line process", as well as the written description of the invention of the '363 patent, the phrase "continuous in-line process" in August 1995 is understood by one of ordinary skill to include the option of perfecting.* Indeed, the word "continuous process" (as used in the recently published Graphic Arts Encyclopedia published by Graphic Arts Technical Foundation, Sewickley, Pa., 1998, compiled by Prof. Frank Ramano and son, page 191, **Group Exhibit B**), is defined as "In any manufacturing process, the ongoing production of a steady stream of material, in contrast to a batch process." The word "in-line" has many meanings, but the one that applies to the technology as discussed is (Encyclopedia, see page 428, **Group Exhibit B**) quoted as follows: "In-line is also descriptive of any series of processes connected in a logical sequence, requiring little user intervention." In addition, the term (Encyclopedia, page 592, **Group Exhibit B**) "perfector /perfecting" means printing on two sides during one pass through a press. These terms had the same meaning in 1995 as they did later in 1998 to those in the art when the Encyclopedia was first published. Note **Exhibit C**, published in 1994. It has been my observation that most (90%) of the printing done in this country is now (year 2000) printed on two sides. The prime example of work printed on one side is folding carton; however, this is changing with the advent of printing coupons on the inside of cartons. "Continuous in-line process" can only be performed today (and in the year 2000 in over 90 plus % of the cases) by employing a press that can "perfect" the work. If "perfecting" were not done, then batch processing would have to be done which would defeat the economics of "continuous in-line processing." By no means in August 1995 were all commercial-size lithographic presses capable of "perfecting." Most I believe, were not. As of August 1995 -- the time of filing of the application leading to the '363 patent -- it is my belief approximately only 30% of new offset lithographic sheetfed presses being sold had "perfecting" units. At that time the 30% was growing rapidly. Today approximately 70% of

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the new sheetfed offset lithographic presses are sold with "perfecting" units. Further, it is my opinion as an expert in the printing arts that, as of August 1995, to one skilled in the art, the term mentioned in the '363 patent "continuous in-line process" would include the option of "perfecting." This is stated for at least the following reasons:

(a) without "perfecting", the work in many cases would have to be put through the press a second time and, therefore, the process would not be "continuous";

(b) "perfecting" was an integral part of the concept known to one of ordinary skill in the printing art of a "continuous in-line process" as of August 1995.

The term "continuous in-line process", found a great number of times in the '363 patent, indeed, had a well-established meaning to one of ordinary skill in the art as of its filing date in August 1995. (Note '363 at the Abstract, line 8; col. 4, lines 10-11; col. 4, lines 23-24; col. 4, lines 31-32; col. 4, lines 33-34; col. 4, line 44; col. 5, line 7; col. 5, line 16; col. 5, line 21; col. 5, line 27; col. 5, line 44; col. 6, line 59; col. 6, line 65; col. 7, line 13; col. 7, line 18; col. 7, line 22; col. 7, line 33; col. 8, line 15; col. 8, lines 22-23; and col. 8, line 27. *That term meant to one of ordinary skill in the art a printing process including the option of perfecting.*

5. In reviewing application Serial No. 08/435,798, I note that the terms "perfect", "perfecting" and "continuous in-line process" are not used. Simply put, the applicants of the '798 do not teach their apparatus and process elements to apply to that process option.

6. In looking at the attached Graphic Arts Monthly Toth article (**Exhibit A**), please note page 3 (**Exhibit A**, underlined). The term "in-line, single-pass production" in that paragraph is used in conjunction with "perfecting" in the last of the article and add-on units.

7. Save for Col. 1, lines 11-19 and , more importantly Col. 16, lines 17-41, U.S. Pat. 5,960,713 has very nearly the same substantive specification and drawings as U.S. Pat. No. 5,651,316 and No. 5,598,777 (note the new disclosure at col. 16, lines 17-41 added to the specification leading to the '713 in August, 1998). The '713, '316 and '777 patents all have a common October 2, 1995 filing date, except for the '713, having a claim to the filing date of Serial Number 08/435,798, May 4, 1995. For the following reasons, I believe it is clear that the '713 applicants are clearly not so entitled to the benefit of the filing date of May 4, 1995 via Ser. No. 08/435,798.

8. The teachings of the "double bump" '713 patent are directed to a *semi-permanent*, if not *permanent* conversion of an offset lithographic printing press for flexographic production. This non-retractable unit applies coating to a flexographic plate

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mounted on *either the plate or blanket* (or both plate and blanket) cylinder of an offset lithographic printing press for direct or indirect (offset) flexography. The term "double bump" as used in the '713 patent, was a novel use of the term. The term normally meant to underlay one color with the same color, be it a solid or a tint. As used in the '713 patent, it means coaters engaging to the plate cylinder and blanket cylinder simultaneously. Nowhere in the '798 does the term "double bump" appear. Nor is the concept taught. Page 13, and pages 17-21 of Ser. No. 08/435,798 as filed teach away from "double bump" because the description specifically refers to the use of one coating/inking unit at a time, and not simultaneous.

9. The '713 patent does not disclose the *cantilevered* or "ferris wheel" device as taught by Serial Number 08/435,798/EP 741025(A2), or any other similar retractable mechanism --- in fact, in my opinion, it teaches completely away from the primary retractable cantilevered teaching of Serial No. 08/435,798. I have reviewed the claims of the '713 patent, and no '713 claim is supported by Serial Number 08/435,798, and the specification and claims of Serial Number 08/435,798 do not, in my expert opinion, provide a teaching which enables one of ordinary skill in the printing art to practice the claimed invention of the '713 patent, or even provides a text which fairly "describes" the claimed invention of the '713 patent. In my opinion, none of the '713 claims are supported by an enabling teaching or an adequate description in Ser. No. 08/435,798.

10. In the alternative, I have been asked to provide my opinion whether the disclosure of Serial No. 08/435/798 *reasonably conveys to one of ordinary skill in the art that the '798 applicants "had possession" of the '713 claimed subject matter.*" It is my opinion those applicants in Serial No. 08/435,798 very clearly did not have possession of the claimed subject matter of the '713 subject matter since in the '798 application they taught use of a specific type of retractable mechanism -- a *retractable, cantilevered* device -- whereas in the '713 patent they taught a *semi-permanent* converted press, and the '798 application did not teach *simultaneous* engagement of the plate and blanket cylinders.

11. Independent Claims 1 and 12 read as follows (with some important provisions in bold that, in my opinion, are not taught by Serial No. 08/435,798) :

"1. In a rotary offset printing press having first and second side frame members and a plurality of printing units each having a plate cylinder, a blanket cylinder, and an impression cylinder supported for rotation in operable combination, the

printing units having a delivery side and a dampener side opposite the delivery side, an interunit operator space between printing units and a dampener or a space for a dampener on the dampener side of each unit, the improvement comprising:

"a printing apparatus for inking or coating, the printing apparatus having a frame movably coupled to at least one printing unit **in the space for a dampener**, the printing apparatus being movable between an on-impression operative position and an off-impression retracted position;

"the movable frame supporting a removable first applicator roller and a

"removable second applicator roller, the first applicator roller, being supported for adjustment into and out of ink or coating association with the plate cylinder and the second applicator roll being cylinder, when the printing apparatus is moved respectively to the on-impression operative position and the off-impression retracted position;

"whereby a continuous or spot film of ink or coating can be applied **simultaneously by the printing apparatus to a plate cylinder and the blanket cylinder and ink or coating can be selectively applied to the plate cylinder or blanket cylinder or a plate mounted thereon if one of the first or second applicator rollers is removed from the frame.**"
(Emphasis supplied)

I understand that this is a so-called Jepsen claim, wherein the '713 applicants admitted that everything in the six-line preamble, up to "comprising" was in the prior art.

"12. A rotary offset printing press having a printing unit of the type having a delivery side and a dampener side, said dampener side having a dampener space for receiving a dampener, comprising, in combination:

"a plate cylinder mounted on the printing unit between the delivery side and the dampener side, and a printing plate mounted on the plate cylinder;

"a blanket cylinder having an ink or coating receptive blanket disposed in ink or coating transfer engagement with the plate for transferring ink or coating material from the image surface areas of the printing plate to the ink or coating receptive blanket;

"an impression cylinder disposed adjacent the blanket cylinder thereby forming a nip between the blanket and impression cylinder whereby the printing ink or coating material is transferred from the blanket to

a substrate as the substrate is transferred through the nip;

"support means mounted on the dampener side of the printing unit;

"an inking or coating apparatus having a removable first applicator roller and a removable second applicator roller, being positioned in the dampener space in place of a dampener, the inking or coating apparatus being coupled to the support means for movement between an on-impression operative position and an off-impression retracted position wherein the first applicator roller is adjustably plate cylinder while the second applicator roller is adjustably supported for simultaneous movement into and out of ink or coating association with the plate on the plate cylinder while the second applicator roller is adjustably supported for simultaneous movement into and out of ink of coating association with the blanket on the blanket cylinder; and

"whereby a continuous or spot film of ink or coating can be applied by the inking and coating apparatus to a plate on the plate cylinder and a blanket on the blanket cylinder and ink or coating can be selectively applied to the plate on the plate cylinder or the blanket cylinder or a plate thereon."

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Again I have placed in bold those limitations/elements that are important/material to claims 1 and 12 and not supported fairly by Serial No. 08/435,798. I note all other claims of the '713 patent are dependent on claims 1 and 12. The bolded limitations/elements of claims 1 and 12 not taught in Serial No. 08/435,798 have the following significance which is critical, in my opinion:

(a) In '713 Claim 1, the emphasized term "**simultaneously**" is supported in the '713 patent in Figure 4, 66 & 67; Figure 5, 66 & 67; Figure 6, 66 & 67; Figure 10, 67C and 66 C; Figure 11, 66C; Figure 12, 130; Figure 14, 67 & 66; Figure 16, 59; Figure 18, 66C; Abstract line 17; col. 1, line 28; col. 3, line 31; col. 10, line 37; col. 11, line 59. Claim 1 requires that coatings/inks are applied **simultaneously** -- importantly and significantly in my opinion, the word "**simultaneously**" is not used in application '798 and is not fairly taught. "**Simultaneous**" printing/coating is and has been rarely used in the industry since most work *traps*. The word "trap" has several meaning in the graphic arts. The most common meaning is the amount of spread/enlargement that is made to type or lines to accommodate the imperfections in stretch of the substrate/paper. In this sense the "trapping" function is

employed on most type of printing today. *Simultaneous* printing is used in the production of some types of can printing, namely beer and shaving lotion. This particular application has little use in the industry and does not require the use of spread/enlargement of type or lines. The use of the word *simultaneous* is also used in '713 to mean a split fountain, i.e. using one ink fountain to apply two or more colors of ink. This split fountain arrangement is prior art. Page 13, lines 7-17 of Ser. No. 08/435,798 teaches **away** from simultaneous engagement; '798 teaches engagement from "*either the plate or blanket position*."

(b) In '713 Claim 1, col. 21, line 12 claim 1 requires that "one of the first or second applicator rollers is *removed* from the frame." (emphasis supplied) Note the '713 patent at col. 7, lines 11-46. Col. 11, lines 52-58 of the '713 supports the claimed applicator roller removal alternative. In application '798, no rollers are taught to be removed from the cantilevered mechanism relative to a primary teaching of simultaneous engagement, notwithstanding any inferences in Fig.4 and col. 13, lines 9-14 to the contrary.

(c) In '713, Claim 12, col. 22, line 41, requires "support means mounted on the dampener side of the printing unit." This is also true of claim 1. (See first bolded language.) In mounting the flexo/coating unit on the dampener side of the press, the press is no longer a lithographic press, but is a specialty dedicated unit. This language is supported in the '713 patent by col.3, line 52; col. 4, lines 5-7; col.13, lines 8-11, Figure 3, 10; Figure 4, 10; Figure 5, 10; Figure 6, 10; Figure 14, entire unit in other figures labeled 10; and Figure 17, 10. In the '798 application, exactly the opposite is taught; namely, the unit is mounted on the *delivery* side of the unit. The '798, in fact, mandates contact on the delivery side -- see page 7 at lines 18-21 -- "when fully retracted, the coater and carriage assembly are lifted to an overhead position overlying the printing unit tower, thus providing complete access to the printing unit cylinders, without causing the printing unit to lose its printing capability." In '798, the unit is supposedly easily retractable so that the press unit can print by the lithographic process.

(d) Claim 12 requires at, col. 22, line 45 rollers "being positioned in the dampener space in place of a dampener." This is supported in the '713 patent by Figures 3-6; col. 3, line 52; col.4, line 5-7; col. 13, lines 8-11; and col. 16, lines 49-58. The '798 application teaches the opposite and stresses that mounting on the *delivery* side is a major advantage--see page 20 of the '798 application as filed, lines 19-23. The '798 incorporates an easy to use feature, namely a drop-down coater/flexo unit which would only take a few

minutes to install. The removal of the dampener system is a major project for a skilled equipment installer and would not be done by an employee of a typical printing firm. My expert opinion would be that it would take two days of work to install and debug the system. I deal with printers on a day-to-day basis. Such installation and adjustment would be unacceptable to the majority of the printers around the world because of the expense required to change-out the equipment and the downtime involved. As a practical matter, any such change to the plate and blanket cylinders would *be permanent* with the loss of capacity following – unacceptable to most printers paying millions of dollars for the modern presses. Factory installers and technicians would be required to make the modifications, especially on removal of the "double bump" system to return the press to normal lithographic operation.

Thus, in my opinion there are two fundamental differences between the '713 patent and the 08/435,798 or EP 0 741 025 (A3) application in that (a) the flexographic coating device in the '713 patent is virtually, if not literally (as mentioned above), *semi-permanently* mounted to the press, *preventing the use of that printing unit for lithographic printing* and (b) 08/435,798 does not teach simultaneous engagement of the plate and blanket cylinders. These are very serious differences. Hence, I do not think the '713 applicants can fairly receive the benefit of the filing date of Serial No. 08/435/798, filed, May 4, 1995.

12 The following additional limitations of dependent Claims 2-11 and 13-26 are in the prior art or are also not mentioned or taught in Ser. No. 08/435,798:

(a) Claim 2 has an additional limitation to Claim 1, but the additional limitation is in the prior art:

"a doctor blade assembly having a reservoir for receiving ink or coating material coupled to the first or second applicator roll."

Claim 2 discusses a doctor blade inking/coating device. This is technology that was used in the gravure printing process for over 50 years, in flexography printing for approximately 15 years, and in coating on offset lithographic presses for about 10 years. It has support in the '713 at col. 11, lines 52-55; col. 12, lines 5-8 and 13-15; and items 67 of Figures 8-9 and col. 18, lines 32 -35. Serial No. 08/435,798 clearly discloses the additional limitations of Claim 2, but as stated, the additional limitation is in the prior art.

(b) Claim 3, also is deficient in the same regard:

"the applicator roller comprising:

a roller having a *resilient* transfer surface." (Emphasis supplied)

Claim 3 requires, in addition to the requirements of Claim 2, that a resilient transfer surface is used on the coating/printing roller. I note that the term "resilient anilox coating roller" is found in Ser. No. 08/435,798 at page 19, lines 4-11, and item 66 of Figs. 4-6. As indicated below for Claim 22, there is, however, inadequate enabling support for "resilient transfer surface" in Ser. No. 08/435,798, which is apparently why material was inserted in August 1998 leading to the '713 patent. This feature once again is in the prior art and was in wide use in the industry as of August 1995. In fact, the technology has been employed for many hundred years

(c) Claim 4 of '713 requires, in addition to the requirements of Claim 1:

"first and second pivot pins mounted on the first and second side frame members, respectively, said pivot pins extending in alignment with the rotational axis of the plate and blanket cylinder;

"the printing apparatus being pivotally coupled for rotational movement on the pivot pins."

This language is supported in the specification in Figs. 2, 3 and 9, openings 88, 90 and pivot pins 88P, 90P and axis "X", and col. 2, lines 58-62, col. 3, lines 58-62 and 66 to col. 4, line 5; col. 8, lines 28-30; col. 12, line 79 to col. 13, line 11 and col. 13, lines 26-37; col. 14, lines 13-19. This use of first and second pivot pins for simultaneous engagement (hence, the "double bump" of the '713) to the plate and blanket cylinders (claim 1, last paragraph) *is not shown or taught in Ser. No. 08/435,798 or EP 741,025 (A2)*, which employs a *cantilevered device* (see Fig. 3, 4) to engage blanket cylinder 34. The same word "pivot" is used in the two different specifications for two different purposes: in the '798 "pivot pin" is used to engage the single coating roller to either the plate or the blanket; in the '713 patent, the bell crank is used to make contact with both the plate and blanket cylinders; and, in the '713 patent, to effect contact with only one cylinder, it is necessary that a roller be removed. In short, the "first and second pivot pins" of the '713 bear no relationship to the pivoting mechanism of the cantilevered device of Ser. No. 08/435,798 or EP 741,025 (A2).

(d) Claim 5 of '713 requires, in addition to the requirements of Claim 1:

"a power actuator pivotally coupled to the printing unit, the power actuator having a power transfer arm which is extendable and retractable; and,

"apparatus coupled to the power transfer arm and to the printing apparatus for converting extension or retraction movement of the power transfer arm into pivotal movement of the printing apparatus relative to the plate and blanket cylinder."

This dependent claim requires a way for power to be supplied to the unit. It is basic technology, and not material. The language is supported by Figs. 4-6, 8, 14 and 17 and items 104, 104A, 106, 106A and col. 13, line 66 to col. 14, line 21. In Ser. No. 08/435,798 and EP 741,025 (A2), there is disclosure in Figs. 4, and page 15, lines 18-26, page 16, lines 9-12, actuators 104, 106 and transfer arms 104A, 106A, but these are for engaging a different type of device - a *cantilevered* device; and therefore, for a different purpose - not for simultaneous engagement ('713 Claim 1) of the plate and blanket cylinders. The additional limitations of Claim 5 can be said to be fairly supported by Ser. No. 08/435,798, but are old in the art.

(e) Claim 6 of '713 requires, in addition to the requirements of Claim 5:

"a bell crank plate having a first end portion pivotally coupled in the printing apparatus for engaging the printing unit and having a second end portion for engaging a stop member; and,

"a stop member coupled to the inking or coating apparatus for engaging the second end portion of the bell crank plate."

I call this and Claim 21 the "bell crank" claims. These additional limitations are supported in the '713 patent by Figs. 4, 5, 8, 14 and 17 (note item 118 and col. 14, lines 26-38.). Ser. No. 08/435,798 and EP 741,025 (A2) disclose bell crank 111 (Note page 15, lines 30-35 and page 16, lines 9-12 and Figs. 3-6, item 111). Serial No. 08/435,798 discloses a bell crank apparatus which is substantially the same as the '713 apparatus, but is very old in the prior art (such apparatus was used in the Rubel press in about 1908, the first offset lithographic press ever made, which is now in the Smithsonian Institute in Washington, D.C.).

(f) Claim 7 of '713 requires, in addition to the requirements of Claim 1:

"the movable frame having first and second side support members;

"the ink or coating applicator rollers being mounted between the first side support member and second side support members and having a reservoir or fountain pan for receiving ink or coating materials;

"cradle means mounted on the first and second side support members, respectively for removably supporting the first and second applicator rollers in the movable frames;

"power transfer means coupled to the applicator rollers for rotation thereof;"

These "dual cradle" limitations are taught in the '713 patent in Figs. 8-10 and 14-17 (Note cradle assemblies 100, 102) and col. 3, lines 65 to col. 4, line 4, col. 11, lines 34-36 and 46-50 col. 13, lines 38-42, col. 17, lines 62-66, and col. 18, lines 34-45 and 49-56. Figure 4 of Ser. No. 08/435,798 shows a potential for a dual cradle, but two rollers are never taught to be mounted at the same time. Fig. 5 does not show a dual cradle. The text supporting the pertinent parts for Fig. 3 of '798 exists at page 8, line 16, and for Fig. 4 at page 13, lines 7-17, but does not teach dual cradle of the '713 patent with two mounted rollers.

(g) Claim 8 additionally requires, in addition to the requirements of Claim 7, the mounting of two applicator rollers not taught in '798:

"the cradle means including a first cradle assembly disposed on the first and second side support members, respectively, and a second cradle assembly disposed on the first and second side support members, respectively;"

In '798 only one applicator roller is used; two application rollers are not employed simultaneously.

(h) Claim 9 additionally requires, in addition to the requirements of Claim 1, a container for holding the ink/coating:

"wherein a container means for containing liquid ink or coating material and means for applying ink or coating material from the container means to a peripheral surface portion of the first and second applicator rolls is provided and supported by the printing apparatus."

This additional limitation, however, is in the prior art and the technology has been used for 20 years or more in the industry. It is supported in the '713 in Figs. 7 and 12 (item 70) and in the specification at col. 8, lines 38 and 54 and 58; col. 9, line 40. Support for counterpart item 70 I believe is found, fairly, in Ser. No. 08/435,798, e.g. at page 11, line 27.

(i) Claim 10 additionally requires, in addition to the requirements of Claim 9, in detail the use of a doctor blade:

"wherein the container means comprises a doctor blade assembly having a reservoir or fountain pan for supplying ink or coating material to each of said applicator rollers, and having a doctor blade disposed for wiping engagement with

each of said applicator rollers when it is received in rolling contact with ink or coating material in the reservoir or pan."

This limitation is taught in the '798 application, but is prior art. A doctor blade has been used in the industry for more than 50 years, as part of the gravure printing process.

(j) Claim 11 additionally requires, in addition to the requirements of Claim 9, a fountain pan which is prior art:

"wherein the container means comprises a fountain pan and the inking applying means comprises a pan for transferring ink or coating material from the fountain pan to said first and second applicator rollers;"

This claim is similar to dependent claim 24. Support for this language is found in the '713 patent in Figs. 4-8 (especially 8), 10-13 and 16-17, and items 53, 53A, 53B, 53P, 55, 66A, 66B, 67A, and 67B and col. 9, lines 63-67 and col. 10, lines 8-28. The drawings of the '798 application support this additional limitation (fountain pans), but there is still no support for the emphasized limitations in Claim 1. The concept has been used in the industry for perhaps 50 or more years.

(k) Claim 13 dependent on Claim 12, has the additional limitation of a coating or flexographic ink utilizing hot air and an exhaust system:

"wherein the plate cylinder, blanket cylinder, impression cylinder and inking or coating apparatus forms a first printing unit, the printing press having a second printing unit for printing or coating the substrate subsequently to the first printing unit, the printing press further including:

"a dryer mounted on the printing press for discharging heated air onto a fresh printed or coated substrate from the first printing unit before the freshly printed or coated substrate is subsequently printed, coated or otherwise processed in the second printing unit."

This hot air dryer limitation is in the prior art and has been used for many years - at least 50. While there is missing support for the cited unsupported limitations for Claim 12, this additional limitation I believe is found in Ser. No. 08/435,798.

(l) Claim 14 likewise dependent on Claim 12 via dependency on Claim 13, additionally requires the use of a dryer mounted adjacent to the impression cylinder to place on the sheet hot air while the sheet is in contact with the impression cylinder:

"the dryer is mounted adjacent to the impression cylinder for discharging heated air onto a freshly printed or

coated substrate while the substrate is in contact with the impression cylinder;"

This is supported in '713 by Fig. 3, 124; Fig. 4, 124, also the same in Fig. 5, and col. 4, line 14-17; col. 14, 59-56; col. 15, lines 4-57; col. 16, line 56; col. 17, line 18. In '798 the use of a hot air interstation dryer with a moisture extractor is mentioned in the abstract line 14, page 18, lines 1-4 and 26; page 19, line 24. The use of hot air dryers and moisture extractors has been used to the best of my recollection in coating technology of waterbased coatings since 1970. Interstation hot air dryers and extractors were first envisioned as a method of increasing wet trapping values of lithographic ink as well as to dry the fountain solution from the surface of poly-coated folding carton board (very popular for the packaging of ice cream). Williamson Printing installed, in the 1991-1992 era, an interstation hot air dryer and extractor, made by a British company, on a press in an effort to improve the trapping of metallic ink, during the early development of the WIMS project.

(m) Claim 15 dependent on Claim 13, additionally requires the use of an extractor to remove moisture, etc. from the ink or coating:

"an extractor coupled to the dryer for extracting hot air, moisture, odors and volatiles from an exposure zone between the dryer and the freshly printed or coated substrate."

The same references apply to claim 15 as in claim 14. Essentially, a hot air dryer or many times called an air knife is not practical without the use of an extractor. Without an extractor, the pressroom would fill with an odor and moisture depending on the type of ink or coating being used. The concept of the extractor is found in the Ser. No. 08/435,798.

(n) Claim 16, dependent on Claim 12, additionally defines the position of the dryer "after it [the substrate] has been transferred from the impression cylinder and while it is in contact with the transfer cylinder":

"a transfer cylinder disposed in the interunit position on the press and coupled in sheet transfer relation with the impression cylinder; and

"an interunit dryer disposed adjacent the transfer cylinder for discharging heated air onto a freshly printed or coated substrate after it has been transferred from the impression cylinder and while it is in contact with the transfer cylinder."

This is shown in '713 Fig. 3, 4, 5, item 126. It should be pointed out that '798 does teach the use of an interunit dryer "adjacent [to] the transfer cylinder", in item 114.

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(o) Claim 17, also dependent on Claim 12, has the following additional limitations:

"wherein the plate cylinder, blanket cylinder, impression cylinder, support means and inking or coating apparatus form a first printing unit, the printing press having a second printing unit including a plate cylinder, a blanket cylinder and an impression cylinder in operable combination, further including:

"a transfer drum coupled in substrate transfer relation with the impression cylinder of the first printing unit and in substrate transfer relation with the impression cylinder of the second printing unit;

"a first dryer mounted adjacent the impression cylinder of the first printing unit for discharging heated air onto a freshly printed or coated substrate while the substrate is in contact with the impression cylinder of the first printing unit;

"a second dryer mounted adjacent the transfer drum for discharging heated air onto a freshly printed or coated substrate after it has been transferred from the impression cylinder of the first printing unit and while it is in contact with the transfer cylinder; and,

"third dryer disposed adjacent the impression cylinder of the second printing unit for discharging heated air onto a freshly printed or coated substrate after it has been transferred from the transfer drum and while it is in contact with the impression cylinder of the second printing unit."

The description appears in the '713 patent in items 124, 126, and 128 of Fig. 4 and Fig. 5, Col 14, line 60-65; Col. 15, line 5, 16-48; Col. 17, line 19. It should be noted that '798 teaches the use of *two*, not *three*, drying units. Second, Ser. No. 08/435,798 does not teach the location of dryers at any other place than after the sheet has been printed and at the impression cylinder.

(p) Claim 18, likewise dependent on Claim 12, describes the use of a cradle for the support of the first applicator roller and the cradle for the second applicator roller, and has the following additional limitations:

"wherein the inking or coating apparatus includes:

"first cradle means for supporting the first applicator roller for engagement with the plate when the inking or coating apparatus is in the operative position; and,

"second cradle means for supporting the second applicator roller for engagement with the blanket when the inking or coating apparatus is in the operative position."

The description appears in 10 of Fig. 3, Fig. 4, Fig. 5, Fig. 6, Fig. 8, Fig. 10, Fig. 14, and Fig. 17. It is also discussed many times throughout the '713 patent. This cradle arrangement is not taught in '798 which teaches only a retractable, cantilevered device using one applicator roller at a time, rather than two application rollers in the operative position simultaneously. The cradle arrangement is similar to the "T" head for offset duplicators. The "T" head on an offset duplicator is a moveable second printing unit capable of being engaged to apply an additional ink to an offset blanket. The "T" head is a cradle device that is sold as an after market add-on device.

(q) In addition to the requirements of Claim 12, Claim 19 requires that the support means comprise:

"first and second pivot means mounted on the first and second side frame members, respectively."

Pivots are very old technology -- much older than a hundred years. This claim is not dissimilar, in my opinion as an expert in the printing arts, to the first paragraph of Claim 14. This language, although the phrase "pivot means" appears nowhere in the '713 patent, is supported in the specification in Figs. 2, 3, and 9, openings 88, 90 and pivot pins 88P, 90P and axis "X", and col. 2, lines 58-62, col. 3, lines 58-62 and 66 to col. 4, lines 5; col. 8, lines 28-30; col. 12, line 79 to col. 13, line 11 and col. 13, lines 26-37; col. 14, lines 13-19. Both disclosures do teach the use of pivots. The '713 use of first and second pivot pins for simultaneous engagement (hence, the "double bump" of the '713) to the plate and blanket cylinders (Claim 1, last paragraph) is not shown or taught in Ser. No. 08/435,798 or EP 741,025 (A2), which employs a cantilevered device (See Fig. 3, 4) to engage the blanket cylinder 34. In short, the "first and second pivot means" of the '713 bear no relationship to the pivoting mechanism of the cantilevered device of Ser. No. 08/435,798 or EP 741,025 (A2).

(r) Claim 20 requires, in addition to the requirements of Claim 12:

"a power actuator pivotally coupled to the inking or coating apparatus, the power actuator having a power transfer arm which is selectively extendable or retractable; and,

"apparatus coupled to the power transfer arm and to the

corresponding support also does not exist in Ser. No. 08/435,798, and hence I believe the additional requirement of Claim 22 is not sufficiently fairly disclosed or taught in Ser. No. 08/435,798, although mention is made of a "resilient anilox coating roller" at p. 7, line 12 and p. 19, lines 7-11.

(u) Claim 23 requires, in addition to the requirements of Claims 1 of 12, the following:

"a supply container for containing a volume of liquid ink or coating material;

"circulation means coupled between the supply container and the inking or coating apparatus for inducing the flow of liquid ink or coating material from said supply container to the inking or coating apparatus and for returning liquid ink or coating material from the inking or coating apparatus to the supply container; and,

"heat exchanger means coupled to the circulation means for maintaining the temperature of the liquid ink or coating material within a predetermined temperature range."

Support for this is found in Figs. 6, 7, 12, 13 and 14 and items 70, 70A, 70B, 71, 73, 75, and 77 and col. 7, lines 19-21; col. 8, lines 37 and 54-63; col. 10, lines 34-46; col. 18, lines 34-39. Such circulation systems of the second element have been known since before 1995; supply containers and heat exchangers have been known for many years. The recirculation system discussed has been in common use in this art, in my opinion, at least since about 1975. Heat devices to reduce viscosity of coatings, e.g., drum heaters, were starting to be used in the early 1990s with lithographic presses. The only counterpart in Ser. No. 08/435,798 is in col. 11, line 27 ("reservoir 70", note Figs. 4 and 6 (EP 741,025 (A2)) only) and the mention of a

"non-illustrated pump" (col. 11, lines 27-29). The use of a heat exchanger was not mentioned in Ser. No. 08/435,798. The 08/435,798 specification is insufficient to constitute support for the requirement of the additional limitations in Claim 23.

(v) Claim 24, requires, in addition to the limitations in Claims 1 or 12, the following:

"a fountain pan for containing a volume of liquid ink or coating material;

"an applicator roller having a metering surface; and,

"a pan roller mounted for rotation in the fountain pan and coupled to the applicator roller for transferring ink or coating material from the fountain pan to the applicator roller."

Support for this language is found in the '713 patent in Figs. 4-8 (especially 8), 10-13 and 16-17, and items 53, 53A, 53B, 53P, 55, 66A, 66B, 67A, and 67B and col. 9, lines 63-67 and col. 10, lines 8-28. I believe support for the additional limitations is supported by the drawings of the '798, but of course, the necessary support for Claim 1 and 12 is missing.

(w) Claim 25 requires, in addition to the limitation found in Claim 1 or 12:

"a resilient packing is mounted on the blanket cylinder, and a printing plate is mounted on the resilient packing."

Support for this additional limitation(s) is found the in '713 in Fig. 5 (phantom lines in printing unit 22) and col. 8, lines 8-28. I can find no express counterpart support to col. 8, lines 8-28 in Ser. No. 08/435,798. What is described technically in Claim 25 is the configuration for a basic lithographic press. A blanket cylinder has a resilient packing paper under the blanket (which is also a resilient surface), and packing paper is under the plate. This is old technology, and was first used in about 1908 by Ira Rubel, whose press is on display in the American Building at the Smithsonian in Washington, D.C.

(x) Claim 26, likewise depends on Claim 1 or 12; requires additionally the following:

"means for applying ink or coating material to the first and second applicator rollers, and the inking or coating apparatus is pivotally mounted on the printing unit in a position in which the nip contact point between the applicator rollers and the blanket and plate cylinders is offset with respect to a radius line projecting through the center of the plate cylinder and blanket cylinder to the axis of pivotal motion of the inking or coating apparatus."

Support for this so-called "triple bump" (see specification, last two columns prior to the claims, '713) is found in the '713 patent at col. 19, lines 28 through col. 20, line 43, and items 97, 97A and 42-43 in Figs. 3 and 4 of the '713. This additional bump refers to end-of-press coater technology in a number of PRI patents. No counterpart disclosure exists in Ser. No. 08/435,798, and, accordingly, '713 Claim 26 is not supported by Ser. No. 08/435,798.

In short, none of the '713 claims are fairly supported or described by Ser. No. 08/435,798 because of the above emphasized limitations in claims 1 and 12 which are

missing from the teaching of Ser. No. 08/435,798. Moreover, as indicated above, the additional limitations of dependent claims 3, 4, 7, 8, 17, 18, 19, 22, 23, 25 and 26 are also not found in Ser. No. 08/435,798.

13. The '713 patent is directed to a teaching for only a very high specialized printer, and could be used only if the need existed in a narrow market. Any economic advantages are questionable, since it is unlikely that a printer would purchase an expensive press and then convert one or more units "semi-permanently" to a flexographic press, which is usually a press of lesser cost to the printer -- the teachings in the '713 patent are primarily directed toward the manufacture of a *semi-permanent* restructuring of an offset lithographic press with dedicated stations for flexographic printing replacing the corresponding changed-out lithographic stations. *Both the blanket cylinder and the plate cylinder are engagable in each of these restructured units. The teaching of the '798 application is diametrically opposite -- a very specialized teaching of a certain form of retractable unit (cantilevered) adapted to save the lithographic option for each unit mounted, and with engagement to either the plate cylinder or blanket cylinder, but not both. It is true that in the industry certain parts of both the '713 and '798 teachings are in common -- e.g., certain traditional lithographic and flexographic parts, and anilox rollers, doctor blades, reservoirs for inks, pivot pins, power actuators, bell cranks, dryers, etc. But that is where the similarity ends. The '713 and '798 machines do not act in the same manner, and are different structurally in many ways and even with respect to the commonly identified parts, the parts are made differently.*

14. In looking over the teaching of this patent, in my professional opinion, the teaching is confusing in several respects:

(a) The "double bump" is novel and of questionable commercial value due to the fact that when ink is applied to the plate cylinder and ink or coating is applied to the blanket cylinder and they overprint - at that time the two may mix or may not trap when the combined image is transferred to the substrate. Technology of a similar type has been used in printing presses for some types of containers -- years ago beer cans, and today for the printing of shaving cream cans and juice cans (large size). The '713 disclosed press is a press that has

two inking systems, possibly two plate cylinders, and one blanket cylinder (many times this has been called a "Y" press.) The problem of placing two non-identical inks or coatings on the same blanket is that they may mix and may not trap. The teaching of the '713 patent at col. 2, lines 58-63, col. 3, lines 12-18 and col. 10, lines 37-54 is confusing. Such mixing is of dissimilar inks and coatings is potentially disastrous in a production pressroom, if in fact totally unworkable. Inks not trapping is not acceptable -- therefore the cans printed today - if printed on a "Y" press (as well as designed) do not have areas that require trapping. Thus, the '713 patent has very little to no application to the general graphic arts community.


(b) The '713 patent describes at col. 13, lines 58-65, placing the unit on the *delivery* side of the press, but states that the preferred position is on the *dampener* side. It is interesting to note that if the unit described in '713 were to be installed on the *delivery* side, it would be inoperable because one could not put a plate or a blanket on the press. I feel that whoever wrote the patent did not build or think through this option. This is exactly opposite of the teaching of 99% of the '713 patent (dampener side) - a contradiction. The '798 claims the unit is only placed on the *delivery* side of the press with a cantilevered device so that the unit may be withdrawn from the unit easily and quickly. *These two documents ('713 and '798) teach exactly the opposite.*

(c) The '713 teaching at col. 16, lines 17-41 is questionable. If one were to manufacture a resilient anilox roller and apply the coating as stated through the sealed doctor blade assembly, it will run for less than a few minutes. This statement in Col. 16, lines 7-41, added in late 1998 to the specification, cannot fairly be made. A doctor blade scrapes coating or ink from the surface of an anilox roller and *is as sharp as a razor blade*. The doctor blades on a sealed doctor blade assembly as recommended by the '713 patent will cut a resilient anilox roller when set with even the lightest pressure.

15. In my original declaration executed on or about May 19, 1999, I provided a curriculum vitae. Presently, I am employed with the Graphic Arts Technical Foundation ("GATF") as Senior Technical Consultant. As part of my duties, I perform independent consulting work for many printers. I have been such a consultant since 1966. Presently,

Jerry Williamson, Chairman of the Board of Williamson Printing Corporation, is an elected member, without pay, of the Board of Directors of GATF, but is not my direct supervisor or even my supervisor's supervisor. I retain my independent status as a consultant, and my actions as a consultant have never been subject to salary reviews or rebuked by a member of the Board of Directors or an officer of GATF in thirty-four (34) years.

The undersigned Declarant stated further that all statements made herein of Declarant's own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.



Raymond J. Prince
Date: 4/20/2000

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MEMORANDUM

To: Jerry Williamson

From: Bill Davis
Bob Emrick
Jim Johnson

Date: November 18, 1994

Subject: Heidelberg Plate Clamps and Chambered Doctor System

Jerry,

We spoke to Bob Boyer and John Dowey today regarding the above reference. I have the following information on the Heidelberg Adjustable Plate Clamps for the coating tower unit.

1. Installation: Installllation of this plate clamp system takes one man approximately 8 hours.
2. The installation of the plate clamps involves pinning the clamps to the cylinder. This would make it impractical to move the clamps from one coating tower to another.
3. Deliver time for the clamps was quoted at 6-8 weeks but Bob believes that this can be hurried up once an order is placed.
4. Pricing: Bob said that if a multiple purchase of more than one clamp is made, the price would be less 10% discount. This would mean that the cost of the clamp system for each tower coater would be \$8,730. Total budget for the 4 tower coaters on the first 3 presses would \$34,920. Total budget for all 5 presses or 6 tower coaters would be \$52,380.
5. The above pricing does include installation of each clamp system.
6. In response to Jesse's desire to run flexo metallics or PMS colors on one of the printing units, John Dowey has responded saying that in theory the plateclamp system could be mounted for this purpose.
7. John also mentioned that once the adjustable plate clamps are mounted on the coater blanket cyclinder, it is necessary to use an aluminum crimped blanket bar in conjunction with the clamp system. This should not present a problem as we are using the crimp on aluminum blanket bars on all of our blankets anyway.

Regarding the Chambered Doctor System for installation on the Heidelberg presses, I have the following:

1. Heidelberg would extend the same 10% discount on this unit. Budget for this unit would be \$60,750 each.
2. Heidelberg recommends installation of this system on the first tower of the triple tower press. The installation of this unit is semi-permanent and would take two men approximately 8 hours to install.
3. The limitations of this system are that it is much more difficult to change the amount of coating applied to the sheet. Whereas, with a standard coater adjustment of the volume of coating can be done with the speed of the coater. With the chambered coater, it will be necessary to change coatings to see if more coating can be applied with a different viscosity coating. The other method for changing the amount of coating would be to change the grain of the annalux roller.
4. The installation of the Chambered Doctor System on the first tower of the triple tower press would allow you to apply metallics or other coatings down first. The technique then calls for drying this coating and applying a sealer with the second tower.

Please let us know if we may be of further assistance in this matter.

Respectfully submitted,

Bill L. Davis
Bob Emrick
Jim Johnson



October 26, 1994

Press Marketing

Telefax to: Jerry Williamson, CEO
Jesse Williamson, President
Williamson Printing Co.

Heidelberg USA, Inc.

From: John Dowe

1000 Gutenberg Drive

Kennesaw, GA 30144

Phone 404 419 8500

Fax 404 419 6625

Subject: *Pre DRUPA Double Coater Press*

Dear Jerry and Jesse:

Mr. Bob Boyer brought your request for the Heidelberg factory to possibly have the DRUPA innovations of running register on the coating units and automatic register in-line, fitted to your Speedmaster CD102S+LYL. This machine is presently under construction and we hope that it will leave the factory in late December.

We regret to inform you that these features cannot be adapted to the present design due to several mechanical and electronic changes, which Mr. Boyer confidentially briefed you on. These options are only available on the DRUPA design machine which would be available in during the third quarter of 1995. They cannot be retrofitted to the existing design.

We confirm that it is now possible to retrofit the coating clamps that allow manual register adjustments and precise mounting of spot coating plates. Thus these could be fitted to the coating units of your existing presses, as well as the December pre-DRUPA CD102S+LYL.

We look forward to meeting with you here in Heidelberg during the week of December 10 to demonstrate the chambered doctor blade system for coating, and give you a private showing of the DRUPA design at the factory as well as a customer installation here in Germany.

Regards,

John Dowe
Marketing Director/Speedmaster

cc: Hans Peetz-Larsen
Wolf Hager
Mike Morgan
Scott Brown
Reginald Rettig, HDM/Germany

1000 GUTENBERG DRIVE
KENNESAW, GA 30144
PHONE 404 419 8500
FAX 404 419 6625

Southwest Region

Heidelberg USA Inc
1801 Royal Lane
Suite 1012
Dallas, TX 75229
Phone 214 506 7000
Fax 214 506 0476

November 8, 1994

Jerry and Jesse Williamson
Williamson Printing Corporation
6700 Denton Drive
Dallas, Texas 75235

Dear Jerry and Jesse,

Pursuant to our conversations regarding the special plate clamps for our coating tower that facilitate the use of Cyrel or other flexo type plates to be mounted and registered, and the Chambered Doctor System for the coating tower, please note the attached information from our Factory.

I highly recommend that you place an order immediately for the special plate clamps so as to expedite factory shipment and installation on your Seven Color press for evaluation.

It is also my recommendation that in conjunction with our trip to Germany on December 10, 1994 to evaluate the Drupa CD Technology, we arrange a demonstration of the Chambered Doctor System. Upon your review and evaluation we can then proceed with your order for the system with the noted approximate delivery and installation times.

As always, it is a pleasure to work with you and your fine group of associates. I look forward to our trip to Germany and to continuing to build and strengthen our partnership.

Sincerely,



Bob Boyer
Regional Manager
Heidelberg USA, Inc.

cc: Bill Davis
Bob Emerick
Jim Johnson

TELETYPE UNIT

BASF CORPORATION

PROPOSAL FOR

WILLIAMSON PRINTING CORPORATION

ENTERED AND RECORDED

cc: Carl Weber
Brian Reilly
File

BASF CORPORATION

BASF Corporation, headquarters in Parsippany, New Jersey, is now one of the ten largest chemical companies in North America with annual sales of over \$5 billion. Products manufactured by our 18,000 employees in North America make up more the 90% of BASF Corporation sales.

Key components of BASF's North American business included Fibers, Chemicals, Information Systems, Structural Materials and the Coatings & Colorants Division.

COATINGS & COLORANTS

The Coatings & Colorants Division is composed of Automotive OEM Coatings, Automotive Refinishing Products, Printing Plates, Publication Inks and Container Inks and Coatings.

The Graphic Systems Operating Division within Coatings & Colorants now integrates BASF's printing products operations and substantially increases our ability to efficiently serve the Graphic Arts industry. This organization combines Printing Plate Systems and Publication Inks. Printing Plate Systems continual progresses with its nyloflex® flexographic plates and processing equipment as well as its nyloprint lines.

Plates, publication inks, coatings and pressroom chemical products position Coatings & Colorants as a broad based supplier to the Graphic Arts industry. Vertical integration in pigments (Chemicals Division, Holland, Michigan) and ink vehicles (Coatings & Colorants Division, Greenville, Ohio) provide the raw material technologies and supply consistency required of a major supplier.

With an extensive localized service and distribution network in the United States, Coatings & Colorants effectively combines all the benefits of large company capabilities with the personalized service of the best of smaller concerns. Coatings & Colorants brings these capabilities to all of the major printing markets.

Coatings & Colorants' strengths in the United States are reinforced by the worldwide strength of the BASF Group with headquarters in Germany.

Extensive research capabilities focused on all aspects of printing technology and supply keeps BASF on the leading edge of technology around the world.

10/13/91 08:29:14

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 - II. Product and Benefits
 - III. Proposal and Options of Financing
 - IV. Proposed Plate Pricing
 - V. Terms and Conditions
 - VI. Rebate Proposal
 - VII. Duration of Agreement
 - VIII. Technical and Customer Service Support
- Appendix:
- Product Specification Sheets
 - Equipment Brochures
 - Quality Assurance

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I. INTRODUCTION

BASF Corporation, Printing Plates Systems is pleased to offer this proposal for our nyloflex® LW 116 coating plates and processing equipment to Williamson Printing Corporation, Dallas, Texas. The benefits detailed in this proposal, such as optimized value, efficient service, product quality and consistency will in our opinion yield significant improvements.

II. PRODUCT AND BENEFITS

nyloflex® LW 116 Coating Plates

BASF coating plates have replaced hand-cut blankets to reduce press "make-ready" and downtime. They are suitable for either aqueous or UV coatings. These plates meet all of the requirements for fine detail coating jobs due to their capacity to hold high resolution elements. They offer high dimensional stability and are mounted comparable to any other printing plate. A register system facilitates accurate positioning.

The nyloflex® LW 116 coating plates represents an ideal combination of advantages.

High contrast

Sharp edges

Uniform coating film

No build-up of offset ink

Technical Information

0.046 inches thick

0.001 inches Polyester base

0.036 inches relief depth

Shore A 75 hardness

Available sheet sizes: 35 x 42, 50 x 58, 51 x 57.8. 8 sheets per carton. LW 116, 35 x 42, are available at \$203.86 per plate.

TOP SECRET

nyloflex® RB 270 L Round Exposing Unit

The newly developed BASF RB 270L round exposing unit exposes nyloflex® coating plates. Different cylinder circumferences allow 1:1 transfer from negatives without time consuming and cost intensive film distortion.

Advantages

- Guide rails provide easy access to the exposing cylinder
- Exposing cylinders of differing diameters and widths are available as necessary
- Fast plate mounting with register bar using conventional register punch. The plate and film are mounted outside of the unit
- Easy to use wrap around vacuum sheet
- Fast vacuum build up
- Short exposure time with high output UV exposure lamps with reflectors
- Simply UV lamp function review
- Electronic timer
- Table top unit supporting frame or legs available as extra accessories

Technical Data

Maximum plate size	32.5 x 55.25 inches*
Cylinder weight	410 lbs. gross, 220 lbs. net
Exposing unit weight	915 lbs. gross, 540 lbs. net
Dimensions	L 79.5 inches W 32.5 inches H 35.5 inches
Power	220 V, Three phase, 60 HZ, 16 amps
Lamps	20 Philips TL 80 W/10 R 59 1/16 inches

* Valid for diameters of 10.625 inches. Maximum exposure cylinder 10.625

nyloflex® DW 135L Washout Unit

The BASF nyloflex® DW 135L continuous flow washout unit provides a convenient, efficient method of processing LW 116 coating plates. The exposed plates are automatically transported by a roller system through the processing section. The nyloflex®

TOP SECRET

DW 135L utilizes the proven principle of friction washout with oscillating plush pads gently removing the unexposed photopolymer with a solution of 1 percent caustic soda maintained between 122 and 131° F. The system provides totally automatic washout, rinsing, and pre-drying.

Advantages

- Dry to dry plate handling
- User friendly operation and maintenance
- Easily removable, long lasting plush pads
- Individually adjustable plush pad supports
- Variable speed plate through put within a suitable range
- Digital displayed flow speed
- Pre-drying by circulated warm air
- Easily readable displays for water temperature and pre-drying temperature

Technical Data

Maximum plate width	53.125 inches
Minimum plate length	15.75 inches
Weight	Approximately 1,430 lbs.
Dimensions	L 144 inches W 87 inches H 52 inches
Tank capacity	53 gallons each
Exhaust rate	280 feet per minute, 4 inch diameter
Power	220 V. Three phase, 60 HZ. 16 amps

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nyloflex® F III Dryer

The BASF nyloflex® F III dryer provides an ease of operation in an energy efficient, user friendly unit. The F III dryer ensures uniform temperature distribution of $\pm 1^{\circ}\text{C}$ within the drawers. Operator safety is enhanced by an automatic shut off of the heating elements and circulation fans when opening the drawers. Additional safety features include an automatic shut down should temperatures exceed safety thresholds.

Advantages

- User friendly
- Uniform temperature distribution
- Energy efficient
- Automatic safety shut off

Technical Data

Maximum plate size	36.25 x 47.25 inches
Dimensions	L 80.8 inches W 42.9 inches H 36.2 inches
Weight	772 lbs.
Exhaust	5 inches diameter
Power	220 V, Three phase, 60 Hz, 50 amps

nyloflex® F III

III. PROPOSAL AND OPTIONS OF FINANCING

- A. BASF will supply, at a substantial discount, its nyloflex[®] coating plates processing systems to Williamson Printing Corporation, Dallas, Texas.
- B. A certified BASF equipment engineer will assist you in the design of your platemaking facility, as well as the installation of the systems.
- C. Qualified BASF technicians will train the in-plant platemakers to properly operate and maintain the systems, maximizing their value.
- D. BASF will provide personnel at no charge to remain on location until all in-plant personnel are qualified in the proper platemaking skills. In addition we will conduct periodic quality control audits of systems procedures to ensure that plate preparation systems are correct and maximizing performance.

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nylotflex[®] COATING PLATE PROCESSING EQUIPMENT

<u>Description</u>	<u>List Price</u>	<u>Williamson Printing</u>
RB 270L 32 x 55.25 inches	\$18,972	\$14,373
DW 135L Max. Plate Width 53.125 inches	\$62,937	\$47,680
F III Dryer 36 x 47.25 inches	\$32,367	\$24,520
Total	\$114,276	\$86,573

Note: The above items have an approximate eight to twelve weeks delivery after receipt of written order. Shipping is F.O.B. Zeeland, Michigan.

EQUIPMENT PURCHASE OPTIONS

The following options are available to Williamson Printing Corporation from the BASF, Printing Plate Systems Division, and are as follows for the purchase of the desired equipment:

- OPTION 1 BASF will provide the desired equipment to Williamson Printing Corporation at the special price requiring a twenty-five (25%) down payment of \$21,643.25 with the order. Williamson Printing Corporation to pay the balance (\$64,929.75) in normal billing time of thirty (30) days.
- OPTION 2 BASF will provide the desired equipment to Williamson Printing Corporation at list price requiring a twenty-five (25%) down payment of \$28,569. Williamson Printing Corporation shall pay the balance of \$85,707 during a period of twelve (12) months in equal payments of \$7,142.25. No interest charges will apply.

BASF will apply plate purchases to our rebate program should Williamson Printing Corporation choose to accept Option 1. BASF will not apply plate purchases to our rebate program should Williamson Printing Corporation choose to accept Option 2. We will apply plate purchases to our rebate program after the payment period in the case of Option 2.

BASF will file the necessary UCC-1 forms while Williamson Printing Corporation pays for the equipment. In addition, Williamson Printing Corporation and BASF must sign an Equipment Sales Agreement.

VI. REBATE PROPOSAL

BASF proposes the following rebate schedule:

<u>ANNUAL PURCHASE VOLUME</u>	<u>REBATE</u>
\$ 25,000 - \$ 49,999	1.5%
\$ 50,000 - \$ 99,999	2.5%
\$ 100,000 - \$ 249,999	5.0%
\$ 250,000 - \$ 499,999	8.0%

Rebate schedule applies only to plate purchases.

VII. DURATION OF AGREEMENT

BASF submits this proposal to Williamson Printing Corporation with all prices on equipment confirmed as of October 13, 1994.

VIII. TECHNICAL AND CUSTOMER SERVICE SUPPORT

Technical Support

BASF provides a 24 hour, 7 days a week, Technical BASF hot line, 1-800-343-4700.

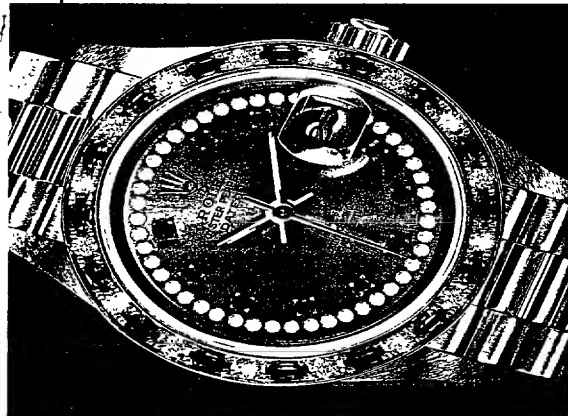
Customer Service

BASF provides extended Customer Service office hours from 8:00 AM to 5:00 PM eastern time.

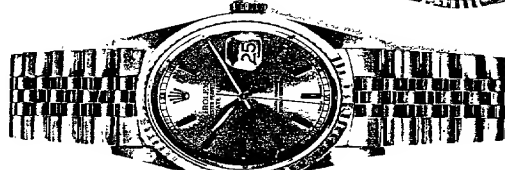
Priority Service - BASF will specify a Customer Service Representative to work with Williamson Printing Corporation to expedite orders and answer any questions that may arise.



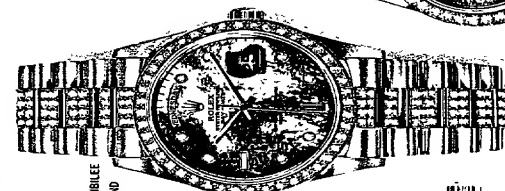
△ 18 KARAT GOLD LADY DATEJUST WITH PEARL DIAMOND DIAL DIAMOND CASE AND BRACELET



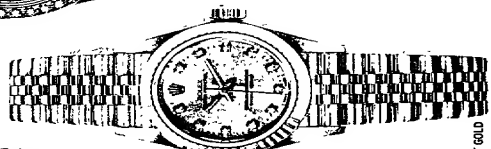
△ 18 KARAT GOLD LADY DATEJUST DIAMOND SETTING DIAL WITH SAPPHIRE MARKERS AND SAPPHIRE AND DIAMOND BEZEL. ENLARGED TO SHOW DETAIL



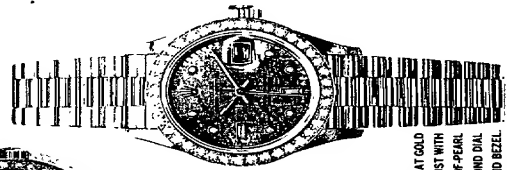
△ 18 KARAT GOLD DATEJUST



△ 18 KARAT GOLD DATEJUST WITH MOTHER-OF-PEARL JUBILEE DIAMOND DIAL AND DIAMOND PRESIDENT BRACELET



△ LADIES' 18 KARAT GOLD OYSTER PERPETUAL



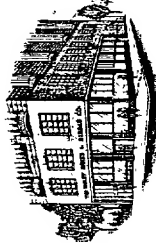
△ 18 KARAT GOLD LADY DATEJUST WITH MOTHER-OF-PEARL JUBILEE DIAMOND DIAL AND DIAMOND BEZEL

Now the hard part: gold or stainless steel? Dayless steel? Day-

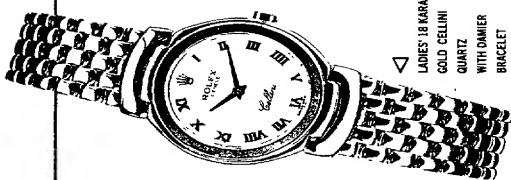
Date? GMT-Master? Datejust? Explorer II? Perhaps you need a closer look; in which case we suggest you visit Bailey Banks & Biddle and have one of our Rolex-trained associates take you through our extensive Rolex collection. Since 1832, we have been providing the finest watches, jewelry and giftware to a clientele accustomed to such things. That's why we carry only the finest quality gems, fashioned into pieces that are as timeless as they are beautiful: diamonds, rubies, emeralds, and pearls blissfully wedded to the world's most precious metals. Each an elegant union of nature's best. So, come in and view these glorious creations. And see why Bailey Banks & Biddle has been the jeweler of choice for seven generations.



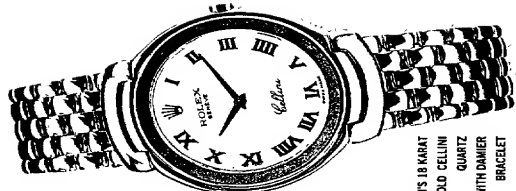
When selecting your Rolex watch ask about our credit plan options, including the Club Account. It enables you to extend the payments of your purchase over ten months, with no finance charge.



* With credit approval and a \$100 minimum purchase, through December 31, 1991. In the United States, the interest rate on the Club Account is 12% per annum, with a 1% per month service charge on late payments. Outside the United States, the interest rate is 15% per annum, with a 1% per month service charge on late payments. Credit program subject to credit review. See store for details. Credit program set up by National Bank.

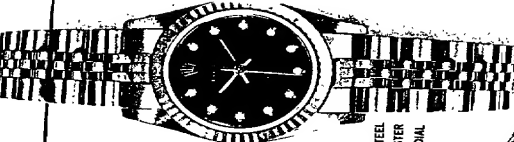


△ LADIES' 18 KARAT GOLD CELLINI QUARTZ WITH DIAMER BRACELET

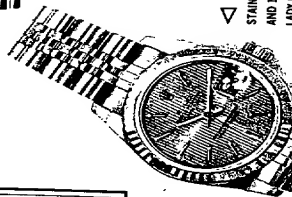


△ MEN'S 18 KARAT GOLD CELLINI QUARTZ WITH DIAMER BRACELET

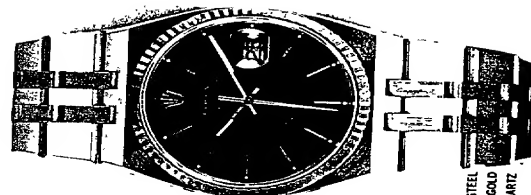
While past civilizations struggled to find a reliable method of measuring time, you have it considerably easier. Simply insist upon a Rolex. Behind the dial that bears the Rolex emblem lies a movement of extraordinary design and craftsmanship. Whether you choose quartz or the famed Perpetual self-winding movement, it will be housed securely in a block of solid 18 karat gold or stainless steel. Giving you a watch that is seemingly impervious to the rigors of modern civilization. One you can depend on for years and years and years.



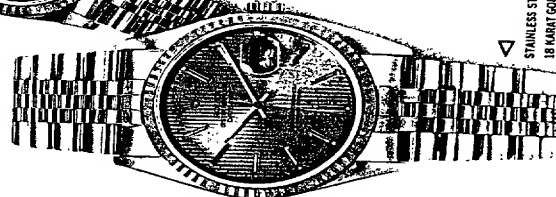
△ LADIES' STAINLESS STEEL AND 18 KARAT GOLD OYSTER PERPETUAL WITH DIAMOND DIAL



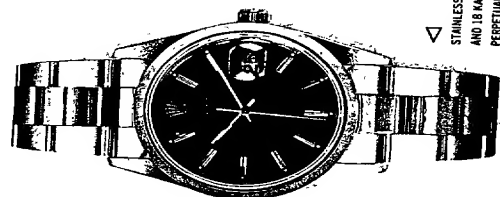
▽ STAINLESS STEEL AND 18 KARAT GOLD LADY DATEJUST



△ STAINLESS STEEL AND 18 KARAT GOLD OYSTERQUARTZ



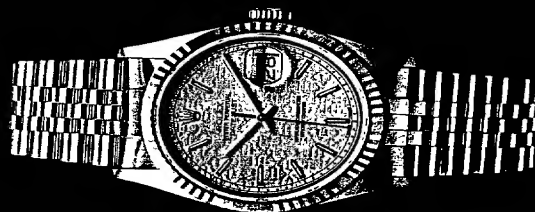
▽ STAINLESS STEEL AND 18 KARAT GOLD DATEJUST



▽ STAINLESS STEEL AND 18 KARAT GOLD OYSTER PERPETUAL DATE

THE JEWELRY OF CHOICE FOR SEVEN GENERATIONS

ROLEX



AND ANOTHER 2,000 YEARS
TO DEVELOP ONE THIS GOOD.

△ STAINLESS STEEL AND 18 KARAT GOLD DATEJUST



WOLSTENHOLME
INTERNATIONAL LTD

HEAD OFFICE
Springfield House
Lower Eccleshill Road
Darwen, Blackburn, Lancashire,
BB3 0RP, England.

Tel: 01254 700099
Telex: 83281 WOLBRO G
Fax: 01254 873009

DATE: 7 March 1995
COMPANY: Williamson Printing
FAO: Jesse Williamson
FROM: Mike Yates cc HEB/SC/HCM
SUBJECT: WIMS Visit

NO. OF PAGES: 1 (incl. this one)

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If this fax is illegible or incomplete please contact me on 01254 87 47 33

Dear Jesse,

Please convey the thanks of Harry, Helen and myself to all the Williamson Printing staff who gave up so much of their time over the last few days. All the journalists were extremely complimentary of the reception they had received and the quality of input from all concerned in Dallas.

It is going to be difficult to measure the impact that the visit will make on the up-take of the WIMS process initially. But over a period of time, after the articles have been published and absorbed, I'm sure we will begin to see the benefits (sales revenue!!).

In the meantime, at Wolstenholme we know we have a great deal more work to complete in order to provide a suitable water-based ink system which will allow the maximum to be achieved from the WIMS 2 process. The immediate aim in Darwen is to de-brief Steve on the results of the test runs at Printing Research in order that we can progress our laboratory work.

We will be in touch with Bill again soon in order to make arrangements to supply a new batch of coating, based on our new resin formulation, which we think will provide another step improvement in the properties desired.

Hope that the weather in Dallas has returned to normal following our departure and thank you all very much again for your wonderful hospitality.

Kind regards,

Michael J. Yates



WOLSTENHOLME
INTERNATIONAL LTD

HEAD OFFICE
Springfield House
Lower Eccleshill Road
Darwen, Blackburn, Lancashire,
BB9 0RP, England.

Tel: 01254 789009
Telex: 63281 WOLARO G
Fax: 01254 873009

DATE: 18TH APRIL 1995

COMPANY: WILLIAMSON PRINTING CORPORATION

FAO: LESLIE - JESSE WILLIAMSON'S SECRETARY

FROM: TRACEY

SUBJECT:

NO. OF PAGES: 4 (incl. this one)

f

a

X

If this fax is illegible or incomplete please contact me on 01254 874721

Dear Leslie,

Please find attached, Gary Doughty's report as requested.

TOP SECRET

Tracey

WILLIAMSON PRINTING ROLLS-OUT REVOLUTIONARY NEW PROCESS

Dallas, TEXAS - March 4, 1995. Williamson Printing Corporation has patented a new process that dramatically increases opportunities for graphic expression using metallic inks. This highly advanced technology called WIMS, for Williamson Integrated Metallic Systems, is now being offered by the Dallas-based company throughout the international graphic arts industry. The unique process makes possible true merging of metallics with other inks to achieve heretofore unattainable realism and visual impact in print.

WIMS incorporates proprietary powders, color separation techniques, and press work perfected after years of research and development by Williamson, its Classic Color Corporation subsidiary, and Wolstenholme International of Darwen, Lancashire, England. WIMS has already enhanced award-winning work ranging from duotone to seven color images for such diverse products as ROLEX watches and LEVIS 501 jeans. The innovation is undergoing further development and Williamson expects to soon introduce a second generation, called WIMS II, that incorporates their Litho-FLEX process offering additional printing applications.

FOR MORE INFORMATION CALL

Jesse Williamson, President
Williamson Printing Corp.
214/904-2114

WIMS PROCESS

WHAT ARE THE BENEFITS TO THE END USER - WHAT EXTRA DOES IT GIVE YOU/WHAT ARE THE ADVANTAGES?

1. Realistic reproduction of metallic objects in print.
2. Artistic applications ranging from lifelike to surrealistic, depending on how and where the metallic effects are applied to an image.
3. Walk-by appeal. The reflectance of the printed image changes subtly as the viewing angle changes (somewhat akin to holography). This effect can occur when walking by a point-of-purchase display, when viewing a busmounted advertisement, when driving past a billboard or the simple act of turning a magazine page.
4. Increased attention span. The unique characteristics of metallic ink printing and the range of applications entice the viewer to look more closely at the

reproduction, thereby enhancing viewer memory of the advertised product or service.

5. In the past few years metallic spot colors have become quite popular. These are inks made by mixing given percentages of metallic ink, generally gold or silver and some process or other spot color ink. To use multiple metallic spot colors on a page different inks would have to be formulated and run for each color. With the WIMS system these colors could be emulated using metallic and process screen tint mixes in the same way spot colors are emulated with process tint combinations today.

HOW IT WORKS (IN RELATION TO THE NORMAL FOUR COLOUR PROCESS).

1. Up to two additional separations (gold and/or silver) are produced from the original artwork.
2. The four colour separations are adjusted to accommodate the additional ink being printed in the metallic areas.
3. Since there are up to five colors to be printed in a given area screen moires are a potential concern. Historically, great effort was taken to mask out the least printing (tertiary) color so that only a maximum of four screened colors remained. This step can obviously be avoided with stochastic screening where screen moire is no longer an issue. We have also had great success using conventional screening at fine-line resolutions (175 line or higher) and duplicating the angle in the metallic sep with one of the traditional 4/c angles (gold at the same angle as magenta, silver at the same angle as cyan).
4. Proofing is typically done using DuPont Cromalin. Because of the larger particle size of the Cromalin powder vs the particle size used in offset inks there is a slightly greater sheen in the off-press proof than is achieved on the final printed piece. This is probably more true in areas where gold ink is printing than is silver.
5. Since silver and gold inks are both inherently opaque they are printed as the first-down colors. The remaining 4-color inks are printing in normal sequence though some adjustment of tack-rating may be required.
6. Some care must be taken with the metallic inks once they are out of the can to avoid tarnishing and oxidation of the inks.

TOP SECRET

IS IT APPLICABLE TO TWO AND THREE COLOR PROCESSES AS WELL?

Yes. There are some highly sophisticated B&W photographic printmaking processes utilizing platinum emulsions. These artistic methods are easily and realistically reproducible using black and gold inks in offset lithography. Old Daguerreotypes have an inherent metallic quality reproducible in this process as well.

DOES THE PRINTING PROCESS CHANGE?

The key issue here is the in-line drying of the metallic inks so the process colors may be successfully overprinted on a single pass through the press. This can be achieved with good ink trapping and overprint measurements by the use of interstation dryers, which force warm air over the sheet as it passes between printing units; leaving a vacant unit between the metallic ink printing unit and the first process ink printing unit to allow more drying time and/or manipulating the properties of the ink vehicle itself to achieve improved ink set-up and drying characteristics. Much work in this regard has been accomplished by Wolstenholme.

HOW MUCH EXTRA DOES IT COST? HOW DIFFICULT/EASY IS IT?

Whether 5 or 6 color (4 color process plus gold and/or silver) there are inherently 25-50% more films, proofing layers, plates and printing units than would be required for straight 4 color process printing. These additional costs can be projected on a fairly linear scale.

Other costs factors have traditionally been the need to manually create the additional (gold and/or silver) separations on expensive high-end computer prepress systems and to print these pieces by "dry-trapping" the process colors over the metallics on press (i.e. running the job through the press twice). In the WIMS system, we have accomplished single-pass (wet-trapping) of the metallic and process inks which results in only half the press time previously required. On the front-end (separation) side, the color selective range tools, alpha channel masking and layering capabilities of Adobe Photoshop 3.0 and other high-end desktop color software, combined with Applescript and other automation tools should help drive down the costs of creating the additional metallic seps. As seven-color (Hi-Fi) separation software tools come to market there are certainly opportunities to use these tools in the creation of metallic color separations also.



May 12, 1995

Mr. Jerry Williamson
Williamson Printing Corp.
6700 Denton Drive
Dallas TX 75235-4497

Dear Jerry,

It was a great pleasure for Steve Garner and me to meet with you, Jesse Williamson and Bill Davis. The following confirms our discussion:

1. **EZ Interstation Flexo Printer/Coater**

- A. Lithoflex as used by PRI to describe its EZ Printer/Coater process is not in conflict with WPC.
- B. PRI is preparing comment for an upcoming coating article in Graphic Arts Monthly relative to the EZ Printer/Coater family, as well as a presentation for the GATF Sheetfed Conference June 25-27, 1995. Both GAM and GATF would like input from WPC. We are suggesting that they both contact you direct.
- C. An order for one Super Blue EZ Interstation Flexo Printer/Coater (your PO 3315) for installation on the first printing unit of your Heidelberg Speedmaster CD 6+LYL is in hand. We anticipate delivery to be approximately 90 days. The price of the coater is to be negotiated. WPC will continue to use PRI's experimental coater installed on the Heidelberg Speedmaster CD 7+L press until PRI has delivered and installed the EZI.
- D. A separate discussion document addressing exclusivity is attached.

2. **Heidelberg Speedmaster CD 6+LYL (Press #3)**

- A. Gloss readings have been taken of the spot water based primer UV overcoat printing job that had various products (golf club, sports shoe, electrical connectors, etc.). The findings are as follows:
 1. Highlight areas -- 97 points (toe of shoe)
 2. Heavy black solids -- 74 points (electrical connectors)
 3. Solid blue -- 84 points (credit card)

We all concluded that this was a classic case of dry back and that we should press forward with the installation of HV on this press to alleviate such dry back problems and also to dry metallic or specialist water based inks in the future.

Page 2

Page 2

- B. The UV lamps in the upsweep of the delivery are to be moved to the lower last horizontal aperture in the extended delivery to:
 - 1. Minimize spray powder contamination when running spot UV applications
 - 2. Minimize the effects of sheet flutter on the cure of UV coatings. This needs to be carried out as soon as is convenient to WPC.
3. Heidelberg Speedmaster CD 8+L (Press #5)
- A. This press is to be supplied UV ready for maximum flexibility. All indications up to this point are that the water based flexo metallic, even when thoroughly dry, will be prone to pile and back trap when applied on early units of a press. The application of UV metallic appears to overcome this problem. The installation of UV throughout would enable WPC to print litho, flexo on any unit, assuming EZ Flexo Printer Coaters were installed, on any substrate at maximized press speeds.
 - B. PRI is to furnish WPC with a proposal for an 11 lamp 'Cold' UV system for this press.
4. Web Offset 38 Inch UV Coating System
- A. PRI is to arrange a visit for WPC to Sheffer's installation of a UV coater on a Heidelberg Harris M1000 in Portland, Tennessee.
 - B. PRI is to prepare a proposal for a joint Sheffer/PRI coater package for installation on WPC's newly proposed press.

We look forward to a continued successful partnership.

Sincerely yours,

John Bird

John Bird
Product Manager

JB:ln

Enclosures:

cc: Jesse Williamson/Williamson Printing Corp.
Bill Davis/Williamson Printing Corp. ✓
Bob Emrick/Williamson Printing Corp.
Steve Garner/PRI
Steve Baker/PRI

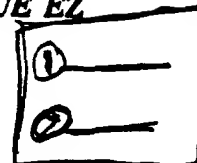


Printing Research Inc.

"Mark-less" Super Blue®



**WPC/PRI PARTNERING AGREEMENT FOR THE SUPER BLUE EZ
INTERSTATION FLEXO PRINTER/COATER**



1. PRI agrees to manufacture and supply one Super Blue EZ Interstation Flexo Printer/Coater (PO #3315) on an exclusive basis.
2. Exclusive is to be interpreted to mean that PRI will not supply to printers in the commercial litho offset printing market for a period and territory to be defined.
3. Exclusions include the litho offset printing markets of folding carton, label, and greeting cards.
 - A. North America, including Mexico and Canada, will be exclusive to WPC for 6 months from the date of delivery of the EZ Interstation Flexo Printer/Coater (PO #3315). 12
 - B. Texas and its contiguous states (Louisiana, Arkansas, Oklahoma, New Mexico) and including Arizona and Colorado will be exclusive for a further 6 months, equaling 12 months from the date of delivery of the EZ Interstation Flexo Printer/Coater. 2 1/2
4. PRI defines 6 months and 12 months exclusivity 3A and 3B to mean PRI will not accept an order for a Super Blue EZ Interstation Flexo Printer/Coater for installation on a printing unit prior to the last printing unit of a press.
5. PRI may request during the term of this agreement to supply to other commercial printers and WPC may not ~~reasonably~~ decline.



Printing Research, Inc.
"Mark-less" Super Blue®

February 16, 1995

Mr. Jesse Williamson
Williamson Printing Company
6700 Denton Drive
Dallas, Texas 75235

214-904-2100 (Phone)

Dear Jesse,

Further to our meeting of 2-11-95 we confirm the following:

1. We are producing an experimental EZ interstation flexo printer coater for installation on your Heidelberg Speedmaster CD 6 color + LYL, 40 inch press with a target to be installed and operational date of March 15, 1995. This unit for adaptation to the first coating tower of the LYL.
2. The experimental EZ coater will have a coating face length of 39.5 inches. Production models for the Coater position 'L' will have a coating face length of 40.55 inches and for interstation printing unit positions will have a coating face length of not less than 38 inches.
3. The experimental EZ coater will be supplied at no charge to Williamson Printing Company. We anticipate that this unit will be replaced by a production unit at a later date.
4. We have enclosed updated proposals for Super Blue EZ interstation flexo printer coaters for installation on your Heidelberg Speedmaster CD presses.

We look forward to serving your needs and thank you for your interest in our Super Blue range of products. For more information please contact us at 1-800-627-5537.

Sincerely yours,

John Bird
Product Manager

JB:rj

cc: Bill Davis - Williamson Printing Company
Howard DeMoore
Steve Garner
Ed Schaffler
Dave Douglas
Steve Baker

**PRIVILEGE LIST FOR PREPARATION OF APPLICATION
LEADING TO U.S. PAT. 5,630,363 MAY 4, 1995 - AUGUST 14, 1995**

<u>Item</u>	<u>Date</u>	<u>Author</u>	<u>Addressee</u>	<u>Claim Description</u>
1	5/16/95	Al Hall - Jones Day Reavis Pogue	Bill Davis	Transmittal letter, advice of counsel and 1 st draft patent application
2	5/16/95- 7/13/95	Bill Davis	Al Hall	Comments on 1 st draft patent application
3	6/30/95	Jones Day Reavis Pogue	WTC	Statement for May 1995 showing intense drafting activities of Hall 5/3/95-5/14/95
4	7/14/95	Al Hall - Jones Day Reavis Pogue	Bill Davis	Transmittal letter with second draft
5	7/15/95- 8/13/95	Bill Davis	Al Hall	Comments on 2 nd draft patent application
6	7/25/95	Jones Day Reavis Pogue	WTC	Statement for June 1995
7	8/14/95	Al Hall	Bill Davis	Transmittal letter, advice of counsel and final draft patent application

7-11-95 3:34 PM



Printing Research, Inc.

"Mark-less" Super Blue®

May 12, 1995

Mr. Jerry Williamson
Williamson Printing Corp.
6700 Denton Drive
Dallas TX 75235-4497

Dear Jerry,

It was a great pleasure for Steve Garner and me to meet with you, Jesse Williamson and Bill Davis. The following confirms our discussion:

1. **EZ Interstation Flexo Printer/Coater**

- A. Lithoflex as used by PRI to describe its EZ Printer/Coater process is not in conflict with WPC.
- B. PRI is preparing comment for an upcoming coating article in Graphic Arts Monthly relative to the EZ Printer/Coater family, as well as a presentation for the GATF Sheetfed Conference June 25-27, 1995. Both GAM and GATF would like input from WPC. We are suggesting that they both contact you direct.
- C. An order for one Super Blue EZ Interstation Flexo Printer/Coater (your PO 3315) for installation on the first printing unit of your Heidelberg Speedmaster CD 6+LYL is in hand. We anticipate delivery to be approximately 90 days. The price of the coater is to be negotiated. WPC will continue to use PRI's experimental coater installed on the Heidelberg Speedmaster CD 7+L press until PRI has delivered and installed the EZI.
- D. A separate discussion document addressing exclusivity is attached.

2. **Heidelberg Speedmaster CD 6+LYL (Press #3)**

W000608

- A. Gloss readings have been taken of the spot water based primer UV overcoat printing job that had various products (golf club, sports shoe, electrical connectors, etc.). The findings are as follows:
 - 1. Highlight areas -- 97 points (toe of shoe)
 - 2. Heavy black solids -- 74 points (electrical connectors)
 - 3. Solid blue -- 84 points (credit card)

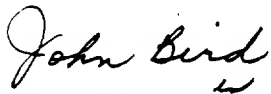
We all concluded that this was a classic case of dry back and that we should press forward with the installation of HV on this press to alleviate such dry back problems and also to dry metallic or specialist water based inks in the future.

Mr. Jerry Williamson
Page 2

- B. The UV lamps in the upsweep of the delivery are to be moved to the lower last horizontal aperture in the extended delivery to:
 - 1. Minimize spray powder contamination when running spot UV applications
 - 2. Minimize the effects of sheet flutter on the cure of UV coatings. This needs to be carried out as soon as is convenient to WPC.
- 3. **Heidelberg Speedmaster CD 8+ L (Press #5)**
 - A. This press is to be supplied UV ready for maximum flexibility. All indications up to this point are that the water based flexo metallic, even when thoroughly dry, will be prone to pile and back trap when applied on early units of a press. The application of UV metallic appears to overcome this problem. The installation of UV throughout would enable WPC to print litho, flexo on any unit, assuming EZ Flexo Printer Coaters were installed, on any substrate at maximized press speeds.
 - B. PRI is to furnish WPC with a proposal for an 11 lamp 'Cold' UV system for this press.
- 4. **Web Offset 38 Inch UV Coating System**
 - A. PRI is to arrange a visit for WPC to Sheffer's installation of a UV coater on a Heidelberg Harris M1000 in Portland, Tennessee.
 - B. PRI is to prepare a proposal for a joint Sheffer/PRI coater package for installation on WPC's newly proposed press.

We look forward to a continued successful partnership.

Sincerely yours,



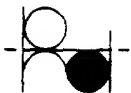
John Bird
Product Manager

JB:ln

Enclosures:

cc: Jesse Williamson/Williamson Printing Corp.
Bill Davis/Williamson Printing Corp. ✓
Bob Emrick/Williamson Printing Corp.
Steve Garner/PRI
Steve Baker/PRI

W000609



Printing Research, Inc.

"Mark-less" Super Blue®



**WPC/PRI PARTNERING AGREEMENT FOR THE SUPER BLUE EZ
INTERSTATION FLEXO PRINTER/COATER**



1. PRI agrees to manufacture and supply one Super Blue EZ Interstation Flexo Printer/Coater (PO #3315) on an exclusive basis.
2. Exclusive is to be interpreted to mean that PRI will not supply to printers in the commercial litho offset printing market for a period and territory to be defined.
3. Exclusions include the litho offset printing markets of folding carton, label, and greeting cards.
 - A. North America, including Mexico and Canada, will be exclusive to WPC for 6 months from the date of delivery of the EZ Interstation Flexo Printer/Coater (PO #3315). 12
 - B. Texas and its contiguous states (Louisiana, Arkansas, Oklahoma, New Mexico) and including Arizona and Colorado will be exclusive for a further 6 months, equaling 12 months from the date of delivery of the EZ Interstation Flexo Printer/Coater. 2/1
4. PRI defines 6 months and 12 months exclusivity 3A and 3B to mean PRI will not accept an order for a Super Blue EZ Interstation Flexo Printer/Coater for installation on a printing unit prior to the last printing unit of a press.
5. PRI may request during the term of this agreement to supply to other commercial printers and WPC may not ~~reasonably~~ decline.

TOP SECRET

W000610



Williamson Printing Corporation

6700 Denton Drive • Dallas, Texas 75235 • (214) 904-2100

May 30, 1995

Mr. John Bird
Product Manager
Printing Research
10954 Shady Trail
Dallas, TX 75220

Re: Letter of Agreement and Understanding

Dear John:

I am in receipt of your letter dated May 12, 1995, including attachments, regarding the above referenced, representing your initial draft of our Letter of Agreement and Understanding, that you prepared pursuant to our agreement, and I apologize for not responding sooner.

As an excuse, our key folks have been out attending DRUPA, and after returning, things have been rather hectic.

Frankly, I have not had the opportunity to carefully consider your draft and receive input from our folks, so I am not prepared at this time to give you a formal response.

However, I do recognize that there are some terms and certain parts of your draft that need a little adjustment. I will respond specifically just as soon as I have the opportunity.

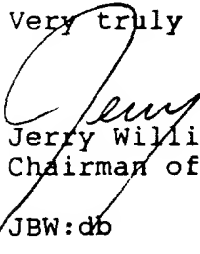
I do anticipate that we will require changes in your initial draft of our Letter of Agreement and Understanding.

Unfortunately, I will be out of town this week, and it will probably be another few days before I have our draft to you.

In the meantime, if you have any questions, please do not hesitate to get in touch with me, or Jesse, Bill and Bob.

Again, my apologies, and I look forward to our working out this opportunity to our mutual benefit and satisfaction.

Very truly yours,


Jerry Williamson
Chairman of the Board

JBW:db

cc: Jesse Williamson
Bill Davis
Woody Dixon
Bob Emrick

A Tradition of Craftsmanship Since 1884

W000611



Williamson Printing Corporation

6700 Denton Drive • Dallas, Texas 75235 • (214) 904-2100

John Bird
Product Manager
Printing Research Inc.
10954 Shady Trail
Dallas, Texas 75220

June 9, 1995

Dear John,

I want to thank you and all the Printing Research people that helped install the additional u v lamps. I think everyone did a great job of meeting dead lines and the press was ready for testing on Sunday morning as promised.

I am sure that you and I learned more on Sundays testing about the LYL and your u v lamps than we ever imagined. The following Monday we put on the first of many forms for Levi (FCB) and the client was quite pleased with our u v gloss. I am pleased to say that we have come along way since our first testing in March.

Now that we have gotten the sheet to cure with (4) lamps at 7,500 IPH I need to hear from you on your plan to get us up to rated speed 13,000 IPH. I apologize for sending this letter so soon after your success but all of our jobs on the Heidelbergs are quoted to average at 10,000 IPH. To have any chance of reaching that average I must be running the press at rated speeds (13,000 IPH).

After all our testing on Sunday I have to wonder if we don't need a little more H V or possibly some I R after the coating unit. Here I worked with you for one day and now I'm an expert. All kidding a side I do need to know what your next plans are so I can block out testing time for Printing Research.

Very Truly Yours

Jim Johnson

CC: J. Williamson
J. Williamson
B. Enrick
B. Davis



Williamson Printing Corporation

6700 Denton Drive • Dallas, Texas 75235 • (214) 904-2100

June 12, 1995

Mr. John Bird
Product Manager
Printing Research
10954 Shady Trail
Dallas, TX 75220

Re: Letter of Agreement and Understanding

Dear John:

With respect to the above referenced, enclosed please find my draft responding to your letter dated May 12, 1995, including the "Exclusivity Agreement."

First of all, I do apologize for my belated response, but I have just recently had a chance to visit with our folks to get their input on this transaction.

After receiving their input on what they believe has been agreed upon, I have attempted to present that position in response to your original "first draft."


Please note that I have revised your "Exclusivity Agreement" document somewhat, and it does include "liquidated damages" provision, as well as how we should go about resolving any misunderstanding under the terms of this arrangement.

Speaking on behalf of all of our folks here at WPC, we are very much excited about the opportunities before us, and our establishing a good, long and mutually beneficial business relationship.

Again, please accept my apologies for the delay, and I am looking forward to hearing from you at your earliest convenience.

In the meantime, if you have any questions, please do not hesitate to give me a call.

Very truly yours,



Jerry Williamson
Chairman of the Board

enclosures

cc: Jesse Williamson, WPC
Bill Davis, WPC
Bob Emrick, WPC
Jim Johson, WPC
Steve Garner, PRI
Steve Baker, PRI

W000613



Williamson Printing Corporation

6700 Denton Drive • Dallas, Texas 75235 • (214) 904-2100

June 12, 1995

Mr. John Bird
Product Manager
Printing Research
10954 Shady Trail
Dallas, TX 75220

Re: Letter of Agreement and Understanding

Dear John:

As promised in my letter of May 30, regarding the above referenced, I will attempt to address the issues set forth in your letter to me dated May 12, 1995. I will address them in the order in which you have outlined in your letter.

Please note my suggestions for the final draft of the Letter of Agreement and Understanding between Printing Research, Inc. (PRI) and Williamson Printing Corporation (WPC), as follows:

1. EZ Interstation Flexo Printer/Coater

- A. Lithoflex - Although your statement is correct, and presents no objection from us, our patent and copyright attorney has advised us that the term "Lithoflex" is already being used by another company.
- B. GAM and GATF - We choose not to participate as you have outlined at this time, for we feel it is somewhat premature, and would not be in our best interest. Consequently, we have declined to participate in the GATF Sheetfed Conference panel.
- C. Super Blue EZ Interstation Flexo Printer/Coater (EZI) - The first such unit which has been installed on the CD 7+L press, is an experimental model that should not count as being one of the units involved in our transaction. We believe that the agreement we reached calls for the first, final design, of the EZI, including all its final features, was suppose to be installed on the 6/C CD 6+LYL, at no charge with the expected installation time to be mid-August 1995. The second such unit, final design, including all final features, etc., is to be offered to WPC at one-half of the list price, as soon as possible. This is the way we understood the agreement, and hopefully this clarifies any misunderstanding.

page 1 of 3

June 12, 1995

page 2 of 3

Re: Letter of Agreement and Understanding

Apparently the WPC PO 3315 that has been issued in your favor, should read "no charge."

- D. Exclusivity Agreement - I will address this document and make my comments on a separate attachment, as it has been presented by you. Basically, I believe we originally discussed having more time than you have indicated.

2. Heidelberg Speedmaster CD 6+LYL (Press #3)

- A. Gloss Readings - It is my understanding that several changes have been made and tested this past weekend, Saturday and Sunday, June 3 and 4, and we have seen some improvement in the "gloss back." However, we are still not achieving our expectations, and it is not performing at an acceptable level, such as achieving expected press speeds, etc.
- B. UV Lamps - Since your PRI document was written on May 12, 1995, further developments have taken place which change the possible plan of action to achieve the minimal spray powder contamination and sheet flutter effects.

In the June 3 and June 4, 1995 testing, we added 4 lamps in the lower horizontal aperture of the extended delivery. At this time, it is not clear what needs to be done to achieve curing of the total sheet surface at maximum press speeds with no spray power contamination.

We will continue working together to achieve this goal.

3. Heidelberg Speedmaster CD 8+L (Press #5)¹⁴

- A. Ordered "UV" Ready - This press has been ordered as suggested.
- B. PRI Proposal to WPC - After we have achieved a "successful test," PRI is to furnish WPC with a proposal, including attractive, discounted prices.

W000615

June 12, 1995

page 3 of 3

Re: Letter of Agreement and Understanding

4. Web Offset 38 Inch UV Coating System

- A. PRI is to arrange a visit for WPC to Sheffer's installation - We agree.
- B. PRI Is To Prepare A Proposal For Joint Sheffer/PRI Coater Package - We agree.

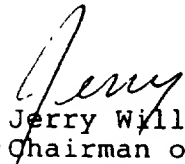
As indicated above, enclosed please find the attachment addressing our "Exclusivity Agreement," for your review.

I hope my comments will be well received, and integrated into our final draft.

In the meantime, we, too, look forward to a continuing successful business relationship.

If you have any questions, please do not hesitate to give me a call.

Very truly yours,


Jerry Williamson
Chairman of the Board

JBW:db

cc: Jesse Williamson, WPC
Bill Davis, WPC
Bob Emrick, WPC
Jim Johson, WPC
Steve Garner, PRI
Steve Baker, PRI

W000616

Williamson Printing Corporation (WPC) and Printing Research, Inc. (PRI) have entered into an agreement for the Super Blue EZ Interstation Flexo Printer/Coater (EZI), and the purpose of this document is to set out the perimeters of that agreement, including the granting of "Exclusive Rights" between the parties.

A brief description outlining the terms of this agreement is set out as follows:

1. PRI agrees to manufacture and supply to WPC one EZI at no cost to WPC. This unit shall not be an experimental unit, but one that has been developed to final form, tested, approved for commercial operation and accepted by WPC. PRI grants WPC "exclusive rights" to this unit within the terms and conditions set out here below.
2. These "exclusive rights" mean that, with respect to EZI, PRI will not sell, supply, assist or, help to install to or for any other commercial printing company, engaged in commercial printing, within the territorial markets, and during the time frames as set out here below:
 - A. National Market - This market is to include all of North America, including Canada, Mexico and the U.S., and WPC is granted these "exclusive rights" for a period of one year, beginning from the date the referenced EZI has been accepted by WPC.
 - B. Regional Market - This market is to include Texas and the continuous states, Louisiana, Arkansas, Oklahoma, New Mexico, and, also to include the states of Arizona and Colorado, and WPC is granted these "exclusive rights" for a period of two years, beginning from the date the referenced EZI has been accepted by WPC.
3. PRI will not ~~accept an order, sell or~~ install the EZI during the "exclusive rights" time period as set out above, by installing the EZI on a printing unit located before, or ahead of, the last printing unit of the press.
4. The "exclusivity agreement" shall exclude those printing firms that are exclusively in the market of producing "folding cartons," "labels," and "greeting cards." This will represent an exception to the "exclusivity rights" as granted WPC from PRI.

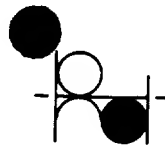
W000617

June 12, 1995
page 2 of 2

EXCLUSIVITY AGREEMENT (cont.)

5. PRI agrees to grant WPC "exclusive rights" for producing products identified and defined as "trading cards" and "pogs," for a period of ten years, and covering a world-wide territory. *by a joint action -*
6. Should PRI desire revisions to the terms of this agreement, it shall request such revisions in writing to WPC, and WPC agrees to respond to such a request on a timely basis, and not withhold approval unreasonably.
7. Should either party violate the terms of this agreement, the party guilty of the violation shall pay the other party liquidated damages in the sum of \$250,000. Such liquidated damages shall be paid in U.S. dollars at the home office of the appropriate party in Dallas, County, Texas, within thirty days of receiving written notice of such violation.
- 7 8. Should any disagreement arise out of this agreement, and the parties cannot reach an agreeable settlement, or an acceptable understanding, both parties agree to have a third-party, unbiased arbitrator, chosen to settle the issue/issues. After such arbitration, if the parties still remain in disagreement, and legal action is required, the jurisdiction for such legal action shall be an appropriate court located in Dallas, County, Texas.

W000618



Printing Research, Inc.

"Mark-less" Super Blue®

July 18, 1995

Mr. Jerry Williamson
Williamson Printing Co.
6700 Denton Dr.
Dallas, TX 75235

214-904-2100 (Phone)

Dear Jerry,

Reference your letter of June 12, 1995. As of today's date it has not proved possible to get the necessary people together to discuss its content.

We are in any case continuing to give an exclusive to WPC in the spirit of our partnering and trust that we will be able to react to your letter in the near future.

We apologize for the delay.

Sincerely yours,

John Bird
Product Manager

WB:th

cc: Jesse Williamson - WPC
Bill Davis - WPC
Bob Emrick - WPC
Jim Johnson - WPC
Howard DeMoore - PRI
Steve Garner - PRI

10954 Shady Trail

W000625



Williamson Printing Corporation

6700 Denton Drive • Dallas, Texas 75235 • (214) 904-2100

July 21, 1995

Mr. John Bird
Product Manager
Printing Research, Inc.
10954 Shady Trail
Dalls, TX 75220

Re: Letter of Agreement and Understanding

Dear John:

I am in receipt of your letter dated July 18, 1995, with respect to the above referenced, and referencing my letter of June 11, 1995.

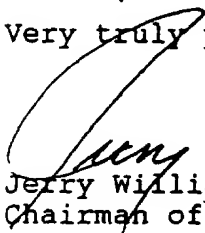
I do appreciate your acknowledging receipt of my letter, and apologizing for not responding and finalizing our Agreement and Understanding, but, far too much time has passed. Please give this your immediate attention, and let us try to bring this matter to "closure."

Again, thank you, and please get back with us at your earliest convenience.

Incidentally, I will be out of the city for two weeks, planning to be back in the office Monday, August 7, 1995, but you can continue this dialogue with any of my other colleagues here at WPC.

Thank you in advance for your cooperation, and please let me know if you have any questions.

Very truly yours,


Jerry Williamson
Chairman of the Board

JBW:db

cc: Howard DeMoore
Steve Garner
Bill Davis
Bob Emrick
Jim Johnson
Jesse Williamson

W000626



Williamson Printing Corporation

6700 Denton Drive • Dallas, Texas 75235 • (214) 904-2100

August 11, 1995

Mr. John Bird
Product Manager
Printing Research, Inc.
10954 Shady Trail
Dallas, Texas 75220

Re: Letter of Agreement and Understanding

Dear John:

Pursuant to our meeting on the afternoon of Thursday, August 10, 1995, this letter will serve to confirm those matters discussed regarding the above referenced, and specifically the draft of my letter concerning same subject dated June 12, 1995.

We reviewed the June 12 letter, referenced, in the same order as presented in the letter, I will set forth here below our comments on those matters in the same order as follows:

1. EZ Interstation Flexo Printer/Coater
 - A. Lithoflex - We are in agreement here.
 - B. GAM and GATE - We are in agreement here.
 - C. Super Blue EZ Interstation Flexo Printer/Coater (EZI) - We are in agreement here.
 - D. Exclusivity Agreement - Our comments and discussion on this agreement will be outlined in more detail later on in this letter.
2. Heidelberg Speedmaster CD 6+LYL (Press #3)
 - A. Gloss Readings - The "gloss back" issue has been addressed in the interim, and a final determination shall be made after our "final testing," which is scheduled for next week.

Williamson Printing Corporation

August 11, 1995

Re: Letter of Agreement and Understanding

Page 2

- B. UV Lamps - The "UV Lamp" issue has been addressed in the interim, and a final determination shall be made after our "final testing," which is scheduled for next week.
- ✓ 3. Heidelberg Speedmaster CD 8+L (Press #5)
- A. Ordered "UV" Ready - This press has been ordered as suggested being "UV prepped."
- B. PRI Proposal to WPC - This press has been "dressed out" and "prepped" with UV interstation drying and is to be tested next week as scheduled.
- ✓ 4. Web Offset 38 Inch UV Coating System
- A. PRI is to arrange a visit for WPC to Sheffer's installation - This has not been accomplished yet, but will be scheduled as soon as is mutually convenient.
- B. PRI Is To Prepare a Proposal For Joint Sheffer/PRI Coater Package - This has not been accomplished yet, but PRI will prepare and present such a proposal just as soon as possible, and no later than one week from this date.
- (1., D.) Exclusivity Agreement (referenced above)
- ✓ 1. We are in agreement, as stated.
- ? 2. Terms on the "Exclusive Rights" shall be modified to allow PRI to accept an order from another printing company, but PRI shall not deliver or install the items ordered until the terms of the "Exclusivity" have expired;
- ? A. National Market - We proposed a compromise from one year to nine months.
- ? B. Regional Market - We proposed a compromise from two years to eighteen months.
3. It was proposed to modify this clause to read that PRI will be allowed to accept orders for their equipment, but not to deliver and/or install it during the "exclusivity term" covering the "time period," as referenced in paragraph #2 above.
4. We are in agreement to this clause as written.

Sheffer's "9665T-60"

define
exp.

W000628

Williamson Printing Corporation

August 11, 1995

Re: Letter of Agreement and Understanding

Page 3

5. Recognizing the basis of your objections, we suggest modifying this clause to read that PRI agrees to grant WPC "exclusive rights" for the products defined as "trading cards" and "pogs" under the same terms as set out above in paragraph #2, and shall not sell to another printing company that is currently producing products, either knowingly or on the basis of "should have known."
6. We are in agreement to this clause as written.
7. You expressed some concern about this clause covering "liquidated damages" and we agreed that you would discuss with your colleagues at PRI concerning the reasons why we believe this clause should be included in our letter of agreement. Liquidated amount would simply establish a fixed amount of damages should either party violate the terms of this agreement. We have agreed to lower the amount of "liquidated damages" to \$100,000. We also determined that the liquidated damages would only be effective after the arbitrator had ruled, as set out below in paragraph #8. Basically, this allows for an orderly, expeditious and cost saving way of settling disputes, if any, that may arise.
8. We are in agreement to this clause as written.

Assuming that the testing is completed as we have scheduled for next week, we have agreed to finalize this "Letter of Agreement and Understanding" no later than August 21, 1995.

Incidentally, another issue that has arisen which was not discussed during our meeting, was the availability of services, including parts, on a 24 hours a day, 7 days a week schedule. As you know, during our recent working together, from time to time PRI has been unable to solve a service problem due to your personnel not being able to obtain the necessary parts during off hours.

As you can appreciate, in order for us to reach our mutual goals and objectives, and to achieve these in an efficient and cost saving fashion, it will be absolutely necessary that we reach a satisfactory solution to this "parts availability problem." Of course, one of the main reasons we chose to enter into this arrangement with you was that the company was located here locally and close to our facilities, which gave us great comfort in your being able to provide us the necessary support, particularly in emergency situations and "off hour" times. Please give me your response and recommended solution on this particular issue just as soon as possible.

W000629

Williamson Printing Corporation

August 11, 1995

Re: Letter of Agreement and Understanding

Page 4 .

I hope that the above fairly well outlines and confirms matters discussed in our meeting, but, if not, please let me know immediately. All of us here at WPC are still very much looking forward to our continuing our "business partnership and alliance."

I want to take this opportunity to thank you for your attention and professional courtesy, and if you have any questions or comments, please do not hesitate to give me a call.

Very truly yours,

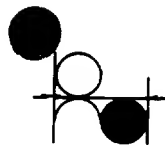


Jerry Williamson

cc: Jesse Williamson, WPC
Bill Davis, WPC
Bob Emrick, WPC
Jim Johnsonm, WPC
Steve Garner, PRI
Steve Baker, PRI

100-445499-1144

W000630



Printing Research, Inc.

"Mark-less" Super Blue®

August 22, 1995

Mr. Jerry Williamson
Williamson Printing Corporation
6700 Denton Drive
Dallas TX 75235

214-904-2100 (Phone)

Dear Jerry,

Referring to your letter of August 11, 1995, we respond to the pertinent points as follows:

1. We are in agreement.
2. We are in agreement.
3. Heidelberg Speedmaster CD102, 8+L (Press #5).
A proposal for 'Cold' UV throughout is enclosed. (Proposal Number 095818).
4. Web Offset, 38 inch UV Coating System.
A proposal for a Super Blue 'Cold' UV Drying System and a Scheffer Coating System is enclosed. (Proposal Number 095822).

Exclusivity Agreement:

1. We are in agreement.
2. Agreed, except that we would like to stay with:
A. National Market - 6 months.
B. Regional Market - 12 months.
3. ~~Proposal is enclosed.~~ *see syll*
4. Proposal is enclosed. *# 91*
5. We cannot agree to this clause since we have no way of knowing what our customers may wish to print and cannot dictate what they print.
6. We are in agreement.
7. We cannot agree to this clause:
Liquidated damages and/or any lawsuit is simply not true to the spirit of our intentions.
8. We are in agreement with this clause, although we do not see the need for an 'unbiased arbitrator.' We do however feel uncomfortable with this clause since it is making our 'Partnering Agreement' more of a legal document than originally intended.

W000631

Williamson Printing Corporation
Page 2.

Servicing Issue:

While we are committed to providing WPC with availability of our service team 24 hours a day, there will be cases when we will not have a man in Dallas able to instantly react to your need. Our service team are all available through pagers and will at least be able to advise over the telephone 24 hours a day. As for spare parts, we recommend a spare parts list that WPC can purchase and avert most difficulties in getting a needed part.

We look forward to a continuing 'Partnering in Progress' and are hopeful that this letter answers all outstanding issues.

Sincerely yours,



John Bird
Product Manager

JB:ln

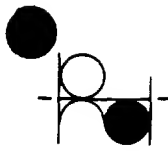
Enclosures:

cc: Jesse Williamson/WPC
Bill Davis/WPC
Bob Emrick/WPC
Jim Johnson/WPC
Steve Garner
Steve Baker

103750-96565

W000632

JESSE
WILLIAMSON



Printing Research, Inc.

"Mark-less" Super Blue®

August 22, 1995

Mr. Jerry Williamson
Williamson Printing Corporation
6700 Denton Drive
Dallas TX 75235

214-904-2100 (Phone)

Dear Jerry,

Referring to your letter of August 11, 1995, we respond to the pertinent points as follows:

1. We are in agreement.
2. We are in agreement.
3. Heidelberg Speedmaster CD102, 8+L (Press #5).
A proposal for 'Cold' UV throughout is enclosed. (Proposal Number 095818).
4. Web Offset, 38 inch UV Coating System.
A proposal for a Super Blue 'Cold' UV Drying System and a Scheffer Coating System is enclosed. (Proposal Number 095822).

Exclusivity Agreement:

1. We are in agreement.
2. Agreed, except that we would like to stay with:
 - A. National Market - 6 months.
 - B. Regional Market - 12 months.
3. Proposal is enclosed.
4. Proposal is enclosed.
5. We cannot agree to this clause since we have no way of knowing what our customers may wish to print and cannot dictate what they print.
6. We are in agreement.
7. We cannot agree to this clause:
Liquidated damages and/or any lawsuit is simply not true to the spirit of our intentions.
8. We are in agreement with this clause, although we do not see the need for an 'unbiased arbitrator.' We do however feel uncomfortable with this clause since it is making our 'Partnering Agreement' more of a legal document than originally intended.

W000633

[illegible]

While we are committed to providing WPC with availability of our service team 24 hours a day, there will be cases when we will not have a man in Dallas able to instantly react to your need. Our service team are all available through pagers and will at least be able to advise over the telephone 24 hours a day. As for spare parts, we recommend a spare parts list that WPC can purchase and avert most difficulties in getting a needed part.

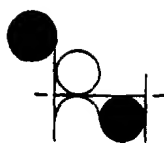
Sincerely yours,

John Bird
Product Manager

Enclosures:

cc: Jesse Williamson/WPC
Bill Davis/WPC
Bob Emrick/WPC
Jim Johnson/WPC
Steve Garner
Steve Baker

W000634



Printing Research, Inc.

"Mark-less" Super Blue®

095818
Williamson Ptg. Corp.
August 18, 1995

SUMMARY OF PROPOSAL
for
HEIDELBERG SPEEDMASTER CD 8CT / 40

<u>QTY</u>	<u>EQUIPMENT</u>	<u>PRICE</u>
1	SUPER BLUE TWELVE LAMP 'COLD' UV DRYING SYSTEM (SCU)	<u>\$338,728.</u>
	TOTAL EQUIPMENT (FOB Factory)	\$338,728.

OPTIONS

MEMORY RAMPING	\$ 9,000. \$16,200.
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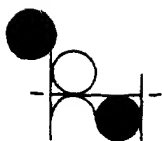
ESTIMATE: INSTALLATION AND TRAINING \$25,000.

<u>QTY</u>	<u>RECOMMENDED SPARE PARTS</u>	<u>UNIT PRICE</u>	<u>EXTENSION</u>
12	SPARE UV LAMPS	338.	\$ 4,056.
4	FILTER TUBES	587.	<u>2,348.</u>
	TOTAL RECOMMENDED SPARE PARTS		\$ 6,404.

'Proposal', 'Sales Terms and Conditions' on Reverse Side and 'Terms of Proposal' Accepted by:

NAME _____
TITLE _____
SIGNATURE _____
DATE _____

W000635



Printing Research, Inc.

"Mark-less" Super Blue®

SCU 0958
Williamson Ptg. Cor
August 18, 19

PROPOSAL

for

SUPER BLUE SCU™ 'COLD' UV DRYING SYSTEM

<u>PRESS</u>	<u>COLOR/SIZE</u>	<u>LAMPS</u>	<u>RATING</u>	<u>PRICE</u>
HEIDELBERG SPEEDMASTER 102CD 8+L	8CT / 40	12	300 watt/inch	\$ 338,728.

One lamp each between printing units 1/2, 2/3, 3/4, 4/5, 5/6, 6/7, 7/8, 8/CT and four in the delivery.

OPTIONS:

Memory	\$ 9,000.
Ramping	\$ 16,200.

RECOMMENDED SPARE PARTS:

UV Lamps (each)	\$ 338.
Filter Tubes (each)	\$ 587.

PURPOSE

Curing (drying) UV inks, varnishes or coating on sheet or web fed presses.

APPLICATION

Paper, Card, Carton Board, Corrugated, Plastic, Foil

CONFIGURATION

Curing heads are linked to impression of press and automatically switch to standby mode when press is off impression for five minutes. If no further action is taken, then lamps automatically turn off; if the press is put back into impression, the lamps automatically return too full power.

Standard Control Unit contains all necessary switchgear and controls to provide individual lamp selection, full and reduced individual power switching, elapsed life meters, lamp indicators and emergency stop button.

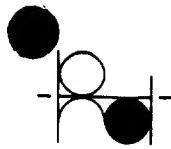
Main power transformer, capacitor banks and closed loop exchanger plant are supplied as floor standing modules. Full safety interlock circuits are fitted throughout. Ozone and heat extraction from the press are not normally required.

SPECIAL FEATURES

- 'Cold' UV Dryer controls integrated with press controls
- 'Panel Ajar/Catwalk' warning to make lamps inoperable
- LED conductivity with diagnostic meter for deionized water system
- Heat exhaust on all between unit stations

Enclosures: Sales Terms and Conditions
Terms of Proposal

W000636



Printing Research, Inc.

"Mark-less" Super Blue®

WCCU 095822
Williamson Printing Corp.
August 22, 1995

PROPOSAL
for
SCHEFFER 4 ROLL WEB COATING & SUPER BLUE WEB 'COLD' UV DRYING SYSTEM

One 38 inch UV coating system suitable for speeds up to 1200 ft/in. - two side application. Features for each side application include but are not limited to the following:

1. **FOUR ROLL DESIGN COATER TRAIN**
 - A. EPDM cover pan roller of 85 durometer, 0-85 RPM with running mechanical impression adjustment to transfer cylinder. Pan roller is variable speed controlled with "skewing" capability for added film regulation. Sunday drive with $\frac{3}{4}$ H.P. for continuous movements of pan roller when press is down. Pan roll has quick change clam shell bearing arrangement.
 - B. Stainless steel anilox transfer cylinder with 200 cell "Roto-Flo" design to facilitate even application of coating. Doctor blade assembly, adjustable on the run from gear to operator side included. Sunday drive similar to pan roll drive included to keep wet cylinders moving. Anti-sling ring assemblies with running adjustments at ends of cylinder transfer is sized larger for optimum material transfer.
 - C. Magnetic plate cylinder, undercut to be discussed and determined by customer based upon type and style of plate to be used. Grid pattern for plate positioning included.
 - D. Solid nickel plated impression cylinder.
2. Both plate and impression cylinders are adjustable on the fly from gear to operator side up to .005".
3. Stainless steel coater pan with double diaphragm recirculating pump/tank and flow control. Internal components designed to operate with U.V. coating material.
4. Motorized 360° circumferential register and $\pm \frac{1}{4}$ " motorized sidelay. Adjustments can be made at coater or at remote station pre-wired and provided by Scheffer. Location to be determined by customer.

W000637

5. Tandler gear box with pneumatic clutch with on/off indicator.
6. Weight of each side coater - approximately 10,000 pounds.
7. On/Off pneumatic impression of plate and impression cylinders.
8. HSP requirements: Running 4 HSP.
 Braking 10 HSP.
9. Two roll, chill roll stand with variable speed control. Rotary unions and piping included. Drive connection included.
10. Main support structure, drive connections and guarding. Four sided work platform, handrails and ladder and all necessary lead in/lead out idler rollers included. These idler rollers are multi-adjustable.
11. A. Six each curing heads linked to impression of press and automatically switch to standby mode when press is off impression for five minutes. If no further action is taken, then lamps automatically turn off; if the press is put back into impression, the lamps automatically return to full power.

 Standard Control Unit contains all necessary switchgear and controls to provide individual lamp selection, full and reduced individual power switching, elapsed life meters, lamp indicators and emergency stop button.

 Main power transformer, capacitor banks and closed loop heat exchanger plant are supplied as floor standing modules. Full safety interlock circuits are fitted throughout. Ozone/heat extraction from the UV dryer tunnel are not normally required.
- B. Special features include:
 - Water Cooled Shutters
 - Water Cooled Heat Sink Plate
 - LED conductivity with diagnostic meter for deionized water system
 - Heat exhaust on each UV lamp head

PRICE: \$697,714 for complete two side application.

Option if installed on an existing press: Web severer and web break detectors
\$6,600.

WCCU 095822
Williamson Printing Corp.
August 22, 1995

SHIPPING INSTALLATION: Estimated at \$20,000-\$40,000. Start-up and training included.

SPARE PARTS: Recommendations: To be advised.

PRICING:

Prices include standard support structure, drive take-off from the press, guarding and crating.

Prices exclude any service charge for the installation, start-up, web-up platforms, ladders or handrails.

TERMS:

50% with order.
40% prior to shipment.
10% net thirty days from date of shipment.

SHIPMENT:

16-20 weeks.

The above shipping schedule is based upon existing backlogs. The actual shipping schedule date will be confirmed upon receipt of order and the down payment.

All equipment "ex-works" Merrillville, Indiana

100-964575-01

W000639

**PRINTING RESEARCH, INC.
TERMS OF PROPOSAL**

1. **PRICING:** Prices are based on clear access to and within the press to install our standard equipment. Any variance, deviation or encumbrance will be subject to price review. Installation is priced separately and all electrical, plumbing, engineering or other contracted services including materials to prepare the site for installation are the customer's responsibility.
2. **TERMS:** 40% with purchase order and signed sales contract. 50% upon notification of readiness for shipment. Please note in order to release shipments, payment must be received. Balance 30 days after installation or 45 days from delivery, whichever is earlier.
Please Note, when payment for a unit is due, it is payable without regard to the status of another unit which might be purchased at the same time.
3. **WARRANTY CONDITIONS:** 12 months on defective parts. **EXCEPTION:** UV Lamps - Guaranteed for 1000 operating hours. If failure occurs prior to 1000 hours of operation and after seller's inspection, proves to be due to manufacturing defects, 100% credit or a free replacement lamp will be provided.
4. **CONDITIONS OF SALE:** This quotation is subject to our "General Terms and Conditions for Coating and Drying Systems" on reverse of Summary. The company accepts no liability whatsoever for any loss of production, loss of profit or other loss to customer in connection with the equipment and/or its installation.
5. **STANDARD DELIVERY:** Is usually 12 - 16 weeks from receipt of official order and first stage payment. FOB Factory.
6. **INSTALLATION AND TRAINING:** \$575.00 per day per man plus airfare. (\$85 per hour if work day exceeds 8 hours).
7. **ELECTRICAL STANDARD:** 220/240, 460/480 volts, 3 or 4 wire (Delta or Wye) 60 hz. Existing electrical services must be specified on the purchase order.

Notes: A. AB1 Air Blanket 1 Infrared Dryer BV BacVac Vacuum Transfer System standard electrical supply voltage 220/240 volts.
B. ABII Air Blanket 11 Infrared Dryer standard electrical supply voltage 460/480 volts.
C. HV High Velocity Hot Air Dryer standard electrical supply voltage 460/480 volts.

Electrical service other than that quoted above may cause a delay and an additional charge for a transformer.

8. SERVICES TO BE PAID FOR AND PROVIDED BY CUSTOMER:

GENERAL: Buyer agrees to prepare the press for installation, which may require relocating accessories including spray powder units, static bars, etc. Any relocation or modification of accessories will be the sole responsibility of the buyer. In the event Printing Research (P.R.I.) technicians are requested to modify or relocate any accessory, there will be an additional charge assessed to the buyer based on P.R.I.'s applicable hourly rate. P.R.I. will not warranty the performance of any accessories moved. When applicable, the buyer will supply clean, dry compressed air.

HV/PBC/IR/UV/EZ/BV/VH

The customer agrees to supply and pay for electricians, plumbers, engineering services and all materials required to install and interconnect (if necessary) the equipment being supplied by Printing Research, Inc. The electrical, plumbing, water, compressed air and refrigeration lines being supplied by the customer are to be connected to the equipment being installed. Printing Research, Inc. is responsible for activating the installed systems and will supply the labor necessary in that regard.

9. ADDITIONAL SPECIFIC SERVICES TO BE PROVIDED BY CUSTOMER:

HV (High Velocity Hot Air Dryer)

- Provide duct work and duct work extraction.
- Provide raised walkplates to cover air supply and return lines lying on the floor.

PBC (Plate Blanket Coater)

- Provide coating and cleaning agent for testing and training.
- 55 gallon barrel of hydraulic oil
- Compressed air line up to 100 p.s.i.
- Lifting gear to place coater on press
- Provide relief plate to conduct plate coating test.

UV (Water Cooled and 'Cold' UV)

- Duct work and extraction, if required
- Clean, dry compressed air adjacent to within 10 feet of the location of lamps; compressor must be able to deliver 0.5 c.f.m. per linear inch per lamp at up to 100 p.s.i.
- The chilling system is not precharged with refrigerant due to the variability of installation requirements and is priced accordingly. The customer agrees to pay for all refrigerant needed to complete the installation.

'COLD' UV

- Provide 25-50 gallons of non-charcoal filtered steam distilled water.
- It is necessary to arrange for a local service water purification contract.

EZ (EZ Impression Cylinder Coater)

- Compressed air line up to 100 p.s.i.
- Provide coating and cleaning agent for testing and training.
- Grippers and gripper bar assemblies need to be cleaned and tuned prior to installation.

W000640

VH (Vent-A-Hood)

- Provide all duct work including penetrating and resealing the ceiling and/or roof and electrical interconnections to other equipment

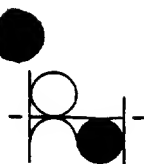
10. LOCAL INSPECTIONS, PERMITS OR CERTIFICATIONS:

- Any additional local inspections, permits or certifications and the costs thereof are the sole responsibility of the buyer.

Prices are firm 60 days from the date of this proposal.

03/10/95

TOP SECRET



Printing Research, Inc.

"Mark-less" Super Blue®

August 22, 1995

Mr. Jerry Williamson
Williamson Printing Corporation
6700 Denton Drive
Dallas TX 75235

214-904-2100 (Phone)

Dear Jerry,

Referring to your letter of August 11, 1995, we respond to the pertinent points as follows:

1. We are in agreement.
2. We are in agreement.
3. Heidelberg Speedmaster CD102, 8+L (Press #5).
A proposal for 'Cold' UV throughout is enclosed. (Proposal Number 095818).
4. Web Offset, 38 inch UV Coating System.
A proposal for a Super Blue 'Cold' UV Drying System and a Scheffer Coating System is enclosed. (Proposal Number 095822).

Exclusivity Agreement:

1. We are in agreement.
2. Agreed, except that we would like to stay with:
A. National Market - 6 months.
B. Regional Market - 12 months.
3. Proposal is enclosed.
4. Proposal is enclosed.
5. We cannot agree to this clause since we have no way of knowing what our customers may wish to print and cannot dictate what they print.
6. We are in agreement.
7. We cannot agree to this clause:
Liquidated damages and/or any lawsuit is simply not true to the spirit of our intentions.
8. We are in agreement with this clause, although we do not see the need for an 'unbiased arbitrator.' We do however feel uncomfortable with this clause since it is making our 'Partnering Agreement' more of a legal document than originally intended.

W000641

[illegible]

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Sincerely yours,

John

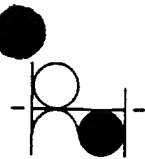
John Bird
Product Manager

JB:ln

Enclosures:

cc: Jesse Williamson/WPC
Bill Davis/WPC
Bob Emrick/WPC
Jim Johnson/WPC
Steve Garner
Steve Baker

W000642



Printing Research, Inc.

"Mark-less" Super Blue®

095818
Williamson Ptg. Corp.
August 18, 1995

SUMMARY OF PROPOSAL
for
HEIDELBERG SPEEDMASTER CD 8CT / 40

<u>QTY</u>	<u>EQUIPMENT</u>	<u>PRICE</u>
1	SUPER BLUE TWELVE LAMP 'COLD' UV DRYING SYSTEM (SCU)	<u>\$338,728.</u>
	TOTAL EQUIPMENT (FOB Factory)	\$338,728.

OPTIONS

MEMORY RAMPING	\$ 9,000. \$16,200.
-------------------	------------------------

ESTIMATE: INSTALLATION AND TRAINING \$25,000.

<u>QTY</u>	<u>RECOMMENDED SPARE PARTS</u>	<u>UNIT PRICE</u>	<u>EXTENSION</u>
12	SPARE UV LAMPS	338.	\$ 4,056.
4	FILTER TUBES	587.	<u>2,348.</u>
	TOTAL RECOMMENDED SPARE PARTS		\$ 6,404.

'Proposal', 'Sales Terms and Conditions' on Reverse Side and 'Terms of Proposal' Accepted by:

NAME _____
TITLE _____
SIGNATURE _____
DATE _____

W000643



Printing Research, Inc.

"Mark-less" Super Blue®

SCU 095811
Williamson Ptg. Corp
August 18, 1992

PROPOSAL

for

SUPER BLUE SCU™ 'COLD' UV DRYING SYSTEM

<u>PRESS</u>	<u>COLOR/SIZE</u>	<u>LAMPS</u>	<u>RATING</u>	<u>PRICE</u>
HEIDELBERG SPEEDMASTER 102CD 8+L	8CT / 40	12	300 watt/inch	\$ 338,728.

One lamp each between printing units 1/2, 2/3, 3/4, 4/5, 5/6, 6/7, 7/8, 8/CT and four in the delivery.

OPTIONS:

Memory	\$ 9,000.
Ramping	\$ 16,200.

RECOMMENDED SPARE PARTS:

UV Lamps (each)	\$ 338.
Filter Tubes (each)	\$ 587.

PURPOSE

Curing (drying) UV inks, varnishes or coating on sheet or web fed presses.

APPLICATION

Paper, Card, Carton Board, Corrugated, Plastic, Foil

CONFIGURATION

Curing heads are linked to impression of press and automatically switch to standby mode when press is off impression for five minutes. If no further action is taken, then lamps automatically turn off; if the press is put back into impression, the lamps automatically return too full power.

Standard Control Unit contains all necessary switchgear and controls to provide individual lamp selection, full and reduced individual power switching, elapsed life meters, lamp indicators and emergency stop button.

Main power transformer, capacitor banks and closed loop exchanger plant are supplied as floor standing modules. Full safety interlock circuits are fitted throughout. Ozone and heat extraction from the press are not normally required.

SPECIAL FEATURES

- 'Cold' UV Dryer controls integrated with press controls
- 'Panel Ajar/Catwalk' warning to make lamps inoperable
- LED conductivity with diagnostic meter for deionized water system
- Heat exhaust on all between unit stations

Enclosures: Sales Terms and Conditions
Terms of Proposal

W000644



Printing Research, Inc.

"Mark-less" Super Blue®

WCCU 095822
Williamson Printing Corp.
August 22, 1995

**PROPOSAL
for**

SCHEFFER 4 ROLL WEB COATING & SUPER BLUE WEB 'COLD' UV DRYING SYSTEM

One 38 inch UV coating system suitable for speeds up to 1200 ft/in. - two side application. Features for each side application include but are not limited to the following:

1. FOUR ROLL DESIGN COATER TRAIN

- A. EPDM cover pan roller of 85 durometer, 0-85 RPM with running mechanical impression adjustment to transfer cylinder. Pan roller is variable speed controlled with "skewing" capability for added film regulation. Sunday drive with $\frac{3}{4}$ H.P. for continuous movements of pan roller when press is down. Pan roll has quick change clam shell bearing arrangement.
 - B. Stainless steel anilox transfer cylinder with 200 cell "Roto-Flo" design to facilitate even application of coating. Doctor blade assembly, adjustable on the run from gear to operator side included. Sunday drive similar to pan roll drive included to keep wet cylinders moving. Anti-sling ring assemblies with running adjustments at ends of cylinder transfer is sized larger for optimum material transfer.
 - C. Magnetic plate cylinder, undercut to be discussed and determined by customer based upon type and style of plate to be used. Grid pattern for plate positioning included.
 - D. Solid nickel plated impression cylinder.
2. Both plate and impression cylinders are adjustable on the fly from gear to operator side up to .005".
 3. Stainless steel coater pan with double diaphragm recirculating pump/tank and flow control. Internal components designed to operate with U.V. coating material.
 4. Motorized 360° circumferential register and $\pm \frac{1}{4}$ " motorized sidelay. Adjustments can be made at coater or at remote station pre-wired and provided by Scheffer. Location to be determined by customer.

W000645

5. Tandler gear box with pneumatic clutch with on/off indicator.
6. Weight of each side coater - approximately 10,000 pounds.
7. On/Off pneumatic impression of plate and impression cylinders.
8. HSP requirements: Running 4 HSP.
 Braking 10 HSP.
9. Two roll, chill roll stand with variable speed control. Rotary unions and piping included. Drive connection included.
10. Main support structure, drive connections and guarding. Four sided work platform, handrails and ladder and all necessary lead in/lead out idler rollers included. These idler rollers are multi-adjustable.
11. A. Six each curing heads linked to impression of press and automatically switch to standby mode when press is off impression for five minutes. If no further action is taken, then lamps automatically turn off; if the press is put back into impression, the lamps automatically return to full power.

Standard Control Unit contains all necessary switchgear and controls to provide individual lamp selection, full and reduced individual power switching, elapsed life meters, lamp indicators and emergency stop button.

Main power transformer, capacitor banks and closed loop heat exchanger plant are supplied as floor standing modules. Full safety interlock circuits are fitted throughout. Ozone/heat extraction from the UV dryer tunnel are not normally required.

- B. Special features include:
 - Water Cooled Shutters
 - Water Cooled Heat Sink Plate
 - LED conductivity with diagnostic meter for deionized water system
 - Heat exhaust on each UV lamp head

PRICE: \$697,714 for complete two side application.

Option if installed on an existing press: Web severer and web break detectors \$6,600.

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2
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W000647

PRINTING RESEARCH, INC.
TERMS OF PROPOSAL

1. **PRICING:** Prices are based on clear access to and within the press to install our standard equipment. Any variance, deviation encumbrance will be subject to price review. Installation is priced separately and all electrical, plumbing, engineering or other contract services including materials to prepare the site for installation are the customer's responsibility.
2. **TERMS:** 40% with purchase order and signed sales contract. 50% upon notification of readiness for shipment. Please note in order release shipments, payment must be received. Balance 30 days after installation or 45 days from delivery, whichever is earlier.
Please Note, when payment for a unit is due, it is payable without regard to the status of another unit which might be purchased at the same time.
3. **WARRANTY CONDITIONS:** 12 months on defective parts. **EXCEPTION:** UV Lamps - Guaranteed for 1000 operating hours. If failure occurs prior to 1000 hours of operation and after seller's inspection, proves to be due to manufacturing defects, 100% credit or a replacement lamp will be provided.
4. **CONDITIONS OF SALE:** This quotation is subject to our "General Terms and Conditions for Coating and Drying Systems" on reverse of Summary. The company accepts no liability whatsoever for any loss of production, loss of profit or other loss to customer in connection with the equipment and/or its installation.
5. **STANDARD DELIVERY:** Is usually 12 - 16 weeks from receipt of official order and first stage payment. FOB Factory.
6. **INSTALLATION AND TRAINING:** \$575.00 per day per man plus airfare. (\$85 per hour if work day exceeds 8 hours).
7. **ELECTRICAL STANDARD:** 220/240, 460/480 volts, 3 or 4 wire (Delta or Wye) 60 Hz. Existing electrical services must be specified on the purchase order.

Notes: A. AB1 Air Blanket 1 Infrared Dryer BV BacVac Vacuum Transfer System standard electrical supply voltage 220/240 volts.

B. ABII Air Blanket 11 Infrared Dryer standard electrical supply voltage 460/480 volts.

C. HV High Velocity Hot Air Dryer standard electrical supply voltage 460/480 volts.

Electrical service other than that quoted above may cause a delay and an additional charge for a transformer.

8. **SERVICES TO BE PAID FOR AND PROVIDED BY CUSTOMER:**

GENERAL: Buyer agrees to prepare the press for installation, which may require relocating accessories including spray powder units static bars, etc. Any relocation or modification of accessories will be the sole responsibility of the buyer. In the event Printing Research (P.R.I.) technicians are requested to modify or relocate any accessory, there will be an additional charge assessed to the buyer based on P.R.I.'s applicable hourly rate. P.R.I. will not warranty the performance of any accessories moved. When applicable, the buyer will supply clean, dry compressed air.

HV/PBC/IR/UV/EZ/BV/VH

The customer agrees to supply and pay for electricians, plumbers, engineering services and all materials required to install and interconnect (if necessary) the equipment being supplied by Printing Research, Inc. The electrical, plumbing, water, compressed air and refrigeration lines being supplied by the customer are to be connected to the equipment being installed. Printing Research, Inc. is responsible for activating the installed systems and will supply the labor necessary in that regard.

9. **ADDITIONAL SPECIFIC SERVICES TO BE PROVIDED BY CUSTOMER:**

HV (High Velocity Hot Air Dryer)

- Provide duct work and duct work extraction.
- Provide raised walkplates to cover air supply and return lines lying on the floor.

PBC (Plate Blanket Coater)

- Provide coating and cleaning agent for testing and training.
- 55 gallon barrel of hydraulic oil
- Compressed air line up to 100 p.s.i.
- Lifting gear to place coater on press
- Provide relief plate to conduct plate coating test.

UV (Water Cooled and 'Cold' UV)

- Duct work and extraction, if required
- Clean, dry compressed air adjacent to within 10 feet of the location of lamps; compressor must be able to deliver 0.5 c.f.m. per linear inch per lamp at up to 100 p.s.i.
- The chilling system is not precharged with refrigerant due to the variability of installation requirements and is priced accordingly. The customer agrees to pay for all refrigerant needed to complete the installation.

'COLD' UV

- Provide 25-50 gallons of non-charcoal filtered steam distilled water.
- It is necessary to arrange for a local service water purification contract.

EZ (EZ Impression Cylinder Coater)

- Compressed air line up to 100 p.s.i.
- Provide coating and cleaning agent for testing and training.
- Grippers and gripper bar assemblies need to be cleaned and tuned prior to installation.

VH (Vent-A-Hood)

- Provide all duct work including penetrating and resealing the ceiling and/or roof and electrical interconnections to other equipment.

10. **LOCAL INSPECTIONS, PERMITS OR CERTIFICATIONS:**

- Any additional local inspections, permits or certifications and the costs thereof are the sole responsibility of the buyer.

Prices are firm 60 days from the date of this proposal.

03/10/95

0001150-00000000

W000648

Subj: [Fwd: Perfecting2]
Date: 5/11/2000 11:24:31 AM Pacific Daylight Time
From: info@gatf.org (Graphic Arts Technical Foundation)
To: RayGATF@aol.com (Ray Prince)

Graphic Arts Technical Foundation
200 Deer Run Road
Sewickley, PA 15143-2600 (USA)
Phone: 412/741-6860, Fax: 412/741-2311
http://www.gatf.org ftp://ftp.gatf.org
email: info@gatf.org

Return-Path: <Mailer-Daemon@email-delivery.infotrac-custom.com>
Delivered-To: gatf@telerama.com
Received: (qmail 15802 invoked by uid 2282); 11 May 2000 18:20:29 -0000
Delivered-To: gatf-awatson@gatf.org
Received: (qmail 15285 invoked from network); 11 May 2000 18:19:10 -0000
Received: from balto.med.iacnet.com (198.112.169.9)
by speedbuggy.telerama.com with SMTP; 11 May 2000 18:19:07 -0000
Return-path: <>
Received: from 127.0.0.1 (LOCALHOST) by EPUB.IACNET.COM (PMDF V5.1-12 #U3379)
with SMTP id <01JP9Z140UQ69EFZZ5@EPUB.IACNET.COM> for awatson@gatf.org; Thu,
11 May 2000 14:18:02 EST
Date: 11-MAY-2000 14:18:02
From: Mailer-Daemon@email-delivery.infotrac-custom.com
Subject: Perfecting2
To: awatson@gatf.org
Message-id: <01JP9Z140YQ09EFZZ5@EPUB.IACNET.COM>
MIME-version: 1.0
Content-type: TEXT/PLAIN; CHARSET=US-ASCII
X-Mozilla-Status2: 00000000

Full content for this article includes photograph, table and illustration.

Source: Graphic Arts Monthly, March 1995 v67 n3 p42(5).

Title: Specialties rule; perfectors return.(includes related article on
how printers wish future sheetfed presses to be)

Author: Debora Toth

Abstract: Perfecting presses are enjoying a comeback in the sheetfed industry as manufacturers undertake massive improvements, which had delighted many commercial shops as well as packaging printers. Due to the ease in switching perfecting presses from a straight to perfecting mode, as well as the enhanced quality the presses produce, printers are increasingly opting for them. Heidelberg official John Dowe notes that with the perfecting abilities of the new machines, he would classify them as specialty presses.

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Date: 5/11/2000 11:24:31 AM Pacific Daylight Time
From: info@gatf.org (Graphic Arts Technical Foundation)
To: RayGATF@aol.com (Ray Prince)

Graphic Arts Technical Foundation
200 Deer Run Road
Sewickley, PA 15143-2600 (USA)
Phone: 412/741-6860, Fax: 412/741-2311
<http://www.gatf.org> <ftp://ftp.gatf.org>
email: info@gatf.org

Return-Path: <Mailer-Daemon@email-delivery.infotrac-custom.com>
Delivered-To: gatf@telerama.com
Received: (qmail 15802 invoked by uid 2282); 11 May 2000 18:20:29 -0000
Delivered-To: gatf-awatson@gatf.org
Received: (qmail 15285 invoked from network); 11 May 2000 18:19:10 -0000
Received: from balto.med.iacnet.com (198.112.169.9)
by speedbuggy.telerama.com with SMTP; 11 May 2000 18:19:07 -0000
Return-path: <>
Received: from 127.0.0.1 (LOCALHOST) by EPUB.IACNET.COM (PMDf V5.1-12 #U3379)
with SMTP id <01JP9Z140UQ69EFZZ5@EPUB.IACNET.COM> for awatson@gatf.org; Thu,
11 May 2000 14:18:02 EST
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Subject: Perfecting2
To: awatson@gatf.org
Message-id: <01JP9Z140YQO9EFZZ5@EPUB.IACNET.COM>
MIME-version: 1.0
Content-type: TEXT/PLAIN; CHARSET=US-ASCII
X-Mozilla-Status2: 00000000

Full content for this article includes photograph, table and illustration.

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six-color press and beyond. No longer is it unique to see seven- or eight-color presses with coating unit on the pressroom floor.

Says KBA-Planeta's McKinney, "We'll be delivering for the first time at the end of May a 40" Rapida with 10 colors. In March, we installed a 10-color 55" press at Rand Whitney/Delmar in Delmar, Del."

Coating continues to be a hot issue with printers as well as manufacturers. No longer is it a specialty unit added to a sheetfed press, but it is now a standard feature. Manufacturers agree that almost all sheetfed presses sold are equipped with a coater, even mid-size sheetfeds at 28".

"Coaters have come a long way in five years," remarks Walter Chmura, Komori America's sheetfed product manager. "We've developed a Type V system of clamps that assemble with our Komori pin system for quick makeready for spot coating."

While coating is popular, the process needed to meet both environmental concerns as well as productivity demands. "End users have driven the printing industry to make the packaging and printed products that we produce more recyclable and at the same time the process less damaging to the air and ground we live on," says Jeff Miller, vice president of marketing at MAN Roland.

He adds, "One of the first processes to be targeted was bronzing with its high volatility of application and health-sensitive particles. While it's fine for environmentalists to say that bronzing must go, designers and marketers still want the product appeal."

"Second, we face productivity demands for in-line, single-pass production. Cost-effective, just-in-time production demands require that a one-pass application be utilized and have the capability of doing everything, such as in-line UV over water-based primer. Or, applying conventional inks or inline gravure-quality metallic inks in a process with one pass utilizing no additional operators or time compared to a normal coater."

MAN Roland, joining with DuPont, Graphix North America, and Hostmann-Steinberg National Inks, developed a double-coating/acrylic-ink technology for the sheetfed market (see page 87).

While most customers here in North America think of a double-coater system as a process for inline UV over a water-based primer and conventional inks, MAN Roland feels that that is only the beginning of its potential.

"We're giving printers a way to differentiate themselves from their competition," says Tony Kenney, MAN Roland's senior product manager for sheetfed presses. "Now it's not unusual to see printers with eight, nine, or 10 units. American printers like anything bigger, faster, and better."

With printers finding competition as fierce as ever, they are depending on their sheetfed press to give them quick makeready, quality printing, minimum downtime, and a fast return on investment.

"Automation is going to continue to be the thrust," says KBA-Planeta's

McKinney. "All of the new automation features are geared toward reducing make-ready time. As a press manufacturer, we're trying to minimize every second of operation on the press. If the press is not printing a saleable sheet, we're going to be looking at reducing or eliminating that time."

Adds Heidelberg's Dowey, "Customers are still looking for machines to increase overall output. It's not that running speed needs to be higher. We've taken a look at unnecessary downtime and we've tried to streamline the process. We're looking at how the press is being used."

In this article, we're covering the mid-size and large-format machines. A second article dealing with small-format, two- to four-color presses will be published in September.

Advanced Graphic Equipment carries a full line of Hashimoto sheetfed presses. The Hashimoto Impulse 20, a 14 3/8 x 20 1/2" press, is available as a single-color machine or as a two-, four-, five-, and six-color press. A new model will be introduced soon.

The Hashimoto Impulse 26, a 20 x 26" press, is available in two-, four-, five-, and six-color configurations. The Hashimoto GR-652 is a 19 11/18 x 26" two-color in-line sheetfed press, which is also available in a perfecting model (GR-652P). Further automation to both models will be introduced this year and their names will change to the Hashimoto Impulse SA-652 and SA 652-P.

Akiyama is introducing two new devices, a plate puncher and automatic plate changer, for its existing machines. "What we've done," says John Sternickle, director of administration, "is design a simple-to-use automatic plate-changing device, in which the operator slides the plate into the holder and starts the cycle. All the plates can be loaded at once and locked in. It's much easier to use because of our design."

Akiyama will start marketing a new product line the end of 1995. A new perfecting press designed for book printers will be introduced. "It almost looks like a web press," says Sternickle. "The gripper edge never changes. The unique feature is that we can maintain print register on either side of the sheet plus back-to-back register. That's important for book printers, as well as magazine and brochure printers."

Consolidated International offers presses in three sizes: 23 x 30", 23 x 36" and 28 x 40" in single-color up to six-color with optional in-line coater. The packaging market continues to be ideal for the firm's larger presses. Recently, the Mexican Ministry of Defense installed a Consolidated six-color to print maps and other defense-related materials.

Heidelberg USA, responding to the continuing interest in coatings, introduced its Multiple Coating Technology on its new 40" Speedmaster CD models with six or more printing units. The system provides package, label, and commercial printers with a cost-effective way to produce high-gloss coatings, metallic finishes, and related special effects, while staying within the bounds of more stringent environmental regulations.

"This system has benefits for both the packaging and commercial printer," says Dewey, director of Speedmaster marketing. The packaging printer is able to

replace his off-line bronzing machine and use our system with a water-based metallic dispersion coating that looks like bronze but with no environmental hazards and less costly operation.

"Commercial printers have the ability to put a dull water-based primer over conventional inks, providing a stable base for a UV coating laid down in-line by the second coating train. The benefit is a high-gloss appearance without the need for UV inks and the special handling they require."

The system consists of a coating tower, drying unit, second coating tower, and an extended delivery. A combination of infrared dryers, hot air knives, and UV curing systems are placed throughout the system to accommodate the needs of various coating materials.

The configuration allows in-line application of two coatings in one pass. This provides more lustrous results and allows use of a virtually unlimited combination of UV and aqueous coating, varnishes, and water-based metallic finishes.

H.M. Graphics, Milwaukee, Wis. was the first U.S. printer to install Multiple Coating Technology. Williamson Printing, Dallas, has two systems on order. A third machine has been installed in Canada.

KBA-Planeta plans to introduce new enhancements to its Rapida 104 sheetfed press following the Drupa show. These new features include the Densitronic closed-loop, on-line densitometer system it developed in conjunction with Graphics Microsystems and the Logotronic management information system.

Komori America has introduced its Computerized Operator Press Control with Color Monitor. The KMS III integrated press control features job preset, PDC II closed-loop densitometric functions, remote camera, system set-up, makeready, job record, press monitor, troubleshooting, and work report.

With the increased popularity of perfecting, Komori is seeing interest in its Lithrone II 240 P perfecting press designed for very short-run work. The press can be fitted with fully automatic plate changing.

Manugraph Machinery Inc., a U.S. subsidiary of Manugraph Industries Ltd., is a year-old office and showroom located in Irving, Texas for the firm's Shiva press line. The Shiva sheetfed press came from Solna-Offset of Sweden, whose technology Manugraph purchased in 1990.

The Shiva sheetfed is available in 20 x 26" and 20 x 28". Manugraph offers MPC-IV for ink feed and segmented blade for ink zone control, and water feed control, as well as plate cylinder lateral and circumferential register control. An anti-static device on the feeder and delivery eliminates electricity build-up on jobs running at the highest speeds.

Ionized air is blown on the feeder pile to remove static electricity for trouble-free feeding. Camera-operated quick-acting plate dams are provided to minimize plate mounting time and reduce makeready.

In February 1995, a four-color Shiva 472HF was installed at P.C. Printing, Dallas. After June 1995, Manugraph will be offering waterless-ready piling

units in the U.S.

MAN Roland has been debuting its Drupa products throughout the U.S. during the past several months. The major focus for the firm is its new double-coating/acrylic ink application system for the Roland 700. The system incorporates anilox technology via a closed chamber application system to apply the ink. The new anilox coating application was field tested at Busche in Dortmund, Germany for the past two years.

Two U.S. printers will be installing the Roland 700 press with double coaters after Drupa. They are Diamond Packaging, Rochester, N.Y., which will be installing a 706 and 707 with LTLV, and Royal Paperbox, Los Angeles, which will be installing a 706 with LTLV.

Mitsubishi, which has 30 of its 40" convertible perfecter presses running worldwide, introduced a new 51" 5F BB blanket-to-blanket, seven-color press. The sheet travels through the drying units and is not turned over within the press.

"We've had good success with the press," says Randy Siver, Mitsubishi's sheetfed product manager. "We've installed one at a label printer and one at a carton printer. They are using the press to print coupons, recipes, and mail-in rebates on the inside of the box."

In addition, Mitsubishi has introduced a new 28" sheetfed press with coater. After the last unit, the press has a triple-size drum, giving the machine more room for access and more time for the sheet to dry thoroughly.

In August 1994, Mitsubishi announced that it would be offering a closed-loop inking system manufactured by Graphics Microsystems. The AutoSmart system is being demonstrated at Mitsubishi's showroom and has been available on its presses since October.

Omnitrade Industrial, at the Graph Expo '94 show in Philadelphia, introduced the 826P waterless 29" two-color press and the 856 29" five-color press. Both are rated at 12,000 iph. One 856 has been installed at Simmons & Co., a commercial printer in Memphis, Tenn.

In January, Sakurai demonstrated its new 258 EPII 17 2/4 x 22 3/4" press to its U.S. dealers before introducing it this month at the Charlotte and Gutenberg regional trade shows. The new press features the Sakurai Interactive System, a digital touchscreen that allows the operator to interact with the press. The new press also features single-action feedboard adjustment.

Shinohara is introducing a number of new enhancements to its line of sheetfed presses. The Shinohara Register-Mark and Image,area Measuring System for high-pile multicolor Shinohara 66 press is designed to improve productivity in such areas as register mark alignment and ink key setup.

The Shinohara 66 IVP is an A2-size offset press featuring an automatic perfecter changeover device, known as the SRIM-1 system, and the MIIIC-Preset console, and the semi-automatic plate changing system.

The automatic changeover device sets up the machine from single-sided

four-color printing to double-sided two-over-two printing without using any tools.

The SRIM-1 system utilizes a laser-guided sensor system to locate the printing plate's register marks and scan the plate's image area for density measurements. These data are recorded on a floppy disk for input into the MIIIC-Preset operation console.

The MIIIC-Preset operation console measures the size thickness of the sheet of paper to be printed, and, through its software interface with the press, sets up the feeder, delivery, and printing pressure.


In addition, the MIIIC-Preset automatically adjusts the radial, lateral, and diagonal register devices of the plate cylinder and also the ink key openings of each printing unit. Then, information, diagnostics, remote control of inking, dampening, and paper preset functions are accessed via a color touchscreen display monitor.

Shinohara has also introduced the Swing-2 Operation Console option for its Model 66II and 66IIP two-color offset presses.

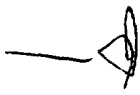
The Swing-2, downsized from the conventional freestanding operation console, is installed at the end of the delivery unit of the press. It is capable of reducing the preprinting makeready time for running two-color and multicolor jobs on the press; using the previous two-color printing data for printing additional two colors on the two-color press; storing the data of frequently used control functions on a floppy disk; and using the preset functions for efficient ink feed adjustment.

Sheetfed Printers Compile a Wish List

What would you like to see on the sheetfed press of the future? That's the question we posed to several leading U.S. printers. Some of their answers surprised us; others had very specific achievable requests.

Many Benskin, co-owner of The Printer, Inc., Des Moines, Iowa, described four areas on his wish list: higher sheen coating, better in-line finishing, higher quality four-over-four perfecting, and an economical roll-to-sheet feeder. 

"I'd like to see an in-line coating unit that provides a higher sheen," says Benskin. "Most customers like the sheen of UV coating. I'd like to get that type of sheen and replace acrylic coating. Secondly, I'd like an improved in-line finishing unit for scoring, perforating, and diecutting. We can do that in-line now but it's very time-consuming. No manufacturers have made a better unit in 30 years."

Benskin would also like to run a four-over-four perfector press without any limitations on stocks and no difference in quality for either side. Finally, he would like to install a roll-to-sheet feeder to save on paper cost and waste. "I'd like to take advantage of paper rolls," he says. "A roll is less costly and I could vary the sheet size and have less waste. The roll-to-sheet feeders available are like dinosaurs." 

Paper is on Curtis Fong's mind as well.

As executive vice president of Fong & Fong, a commercial printer in Sacramento, Calif., he is seeking to detect paper dust and hickeys on paper. "With the quality of recycled paper, we find that there's lots of paper dust and foreign particles," he relates.

"When we're printing solids, we have to stop the press, clean the blanket, and remove the hickeys. I'd like to see an automatic device that would clean the blanket and remove the hickeys without stopping the press. I don't like to lose valuable press time."

Any type of automatic features that curtail press checks and lessen unproductive press time is on Fong's wish list. "We're installing a new press that has addressed these problems," says Fong. "We're not looking for a higher speed press; we wanted to change over our short-run jobs as quickly as possible."

Bob Murphy, president of Japs-Olson, Minneapolis, echoes the sentiments on makeready. "We always talk about speed, but what we want is a significant reduction in makeready times," he says. "Any assists manufacturers can give us, whether it be automatic plate hanging, getting units in register, or simplification of color control systems, would be a help. The manufacturers have already given us automatic or semi-automatic press settings."

Murphy's wish list also includes a 12-color press. "When we had our first eight-color, our clients filled it up. I can certainly foresee 10-color and if they had a 12-color, we'd buy it."

As for the future, Murphy is seeking a direct-to-plate press. "They are still in the developmental stage, but they are vastly improved. When it's available, it will be a great thing."

Manufacturers, take note. Let's see if you can make some of these wishes come true.

BY DEBORAH TOTH

PROJECT EDITOR

— End —

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Ink Setoff

The sticking together of paper sheets due to ink setoff is called **blocking**. Separation of blocked sheets can result in severe damage to one or both of them.

Ink Stability

Alternate term for **screen stability**. See **Screen Stability**.

Ink Stripe Method

Alternate term for **picture method**, a test designed to evaluate the setting of an offset press's **form rollers**. See **Picture Method**.

Ink Trap

See **Trap** (second definition).

Inkwell

The blocked-out portion of a **screen printing** screen used as an ink **fountain** or reservoir. Also known simply as a **well**.

Inlay

In **binding and finishing**, a decoration added to a book cover by first cutting or **blanking** apertures into the cover. See also **Onlay**.

In-Line

In typography, a style of type that has a chiseled effect, as if chipped out of stone. Although classic in appearance, their use in small doses is most effective, and they are often used in display type and are especially well-suited to dropping out from a dark background. At small sizes, however, the letters tend to fill in. Also referred to as **engraved**.

In-line is also descriptive of any series of processes connected in a logical sequence, requiring little user intervention. For example, **in-line presses** have a variety of finishing devices—folders, diecutters, binders, etc.—attached in the proper sequence after the printing unit, so that a printed piece passes directly through all the printing and finishing stages without being taken off press and placed in another set of devices. (See **Web Offset Lithography: In-Line Finishing**.) Some **imagesetters** also have in-line processors that develop the exposed film as it comes out of the device, eliminating the need to physically remove the film and re-insert it in a processor.

In-Line Covering

In **perfect binding**, any binding system on which covers are attached on gathered and glued **signatures** in a single process.

In-Line Feed

In computing by means of paper tape, alternate term for **center feed**. See **Center Feed**.

In-Line Press

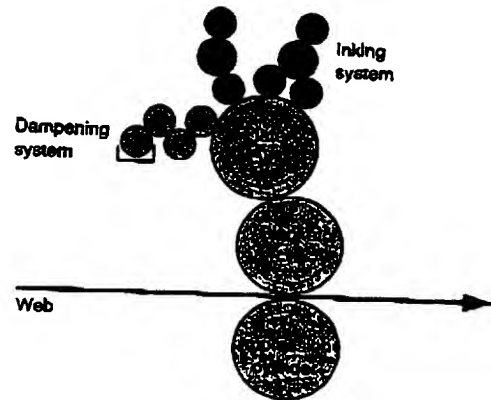
A printing press connected directly to any of several finishing operations, such as stamping, diecutting, sheeting, creasing, folding, etc., so that the printed **substrate** does

Inorganic Color Pigments

not need to be demounted from the press and remounted on the finishing equipment.

The term **in-line press** also refers to a multicolor press in which all the **color stations** are mounted in a straight horizontal line, rather than in a circle around a **common impression cylinder** or in a vertical stack.

An in-line press is also known as a **tail-end printer** or a **tailprinter**.



One color station of a multicolor in-line printing press

In-Line Problem

A problem of **process color** printing characterized by one page on a printing press requiring different amounts of ink than a page printing below it.

Inorganic Color Pigments

Pigments used in ink manufacture derived from inorganic mineral sources (in contrast to **organic color pigments**). There are several different varieties of inorganic pigments classified primarily by their source.

The inorganic pigments listed below are classified and identified in the Society of Dyers and Colorists' Color Index. Each classification consists of two parts, corresponding to the two parts of the index: the first part identifies each pigment with a CI number, which accompanies a description, usage, and technical information. The second part lists each pigment by chemical composition and assigns each one a single number. Thus, Cadmium Yellow below is listed in Part 1 as **CI Pigment Yellow 37** and in Part 2 as **Ne 77199**. These two sets of identifications accompany the individual entries on each separate pigment.

Chromes. Chromes are generally derived from various lead compounds, are fast-to-light (although some do darken on exposure to light, or on contact with sulfur gases), opaque, and heavy. They hold up well when mixed with solvent- and oil-based **vehicles**, and they are generally acid- and alkali resistant. **Chrome Yellows** and **Chrome Reds** (comprising several shades ranging from greenish to orange) are produced from lead chromate mixed with other lead compounds, such as lead sulfate. **Chrome Green** is

Contact Screen

Contact Screen

A screen used in the production of *halftones* that is placed between and in direct contact with the original *continuous-tone* positive and the unexposed film. When light passes through the original and the screen, and strikes the film, a *halftone negative* will result.

Contented Access

In a *local area network*, an access method for the network in which connected devices gain entry to the communications medium on a first-come, first-served basis. See also *Explicit Access*.

Content

The actual information contained by a document, presentation, Web page, multimedia production, etc., independent of the structure, layout, and design.

Contention

In networking, competition or conflict between two or more nodes for access to the transmission medium, channel, or other system resources. In order to effectively handle the occurrence of *collisions* between messages transmitted simultaneously, some form of arbitration is required. See *Carrier Sense Multiple Access/Collision Detection (CSMA/CD)*.

Content Search

In database systems, a type of *search* in which the system can read through all the text to match a user-defined character string.

Context-Sensitive Help

In computing, a feature of an application that allows the user to access instructions of *help files* specific to the mode or status he or she is in. A context-sensitive help can also help resolve a particular error condition.

Context Switching

In computing, the ability to switch from program to program without having to quit one and launch another. Unlike true *multitasking*, however, all additional programs loaded in memory must halt when a new program is switched to. See *multitasking*.

In CAD graphics, *context switching* refers to the ability to control the visibility of layers on the display by switching between or among groups that share similar attributes.

Continuity

In video, television, film, or multimedia production, the maintaining of consistency from scene to scene, shot to shot, or screen to screen. A common example in cinematic production is the water level of a glass that changes from one shot to another within the same scene. This is known as *continuity*. In multimedia, a button that is active in one screen must be active in the next.

Continuous Process

Continuous Code

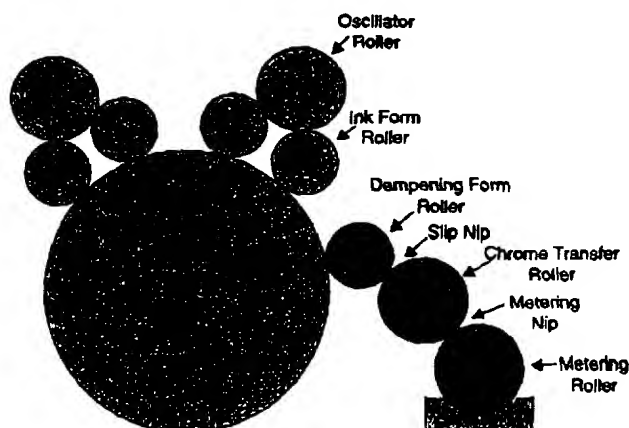
A type of *bar code* that lacks gaps between the characters comprising the code.

Continuous Envelopes

A set of envelopes produced as a long sheet, each of which is separated by perforations, so they can be pin-fed through a computer printer or other device.

Continuous-Flow Dampening System

A type of *dampening system* used in offset lithographic presses that utilizes a *metering roller* in constant contact with both the *water fountain* and a *transfer roller*, which in turn is in constant contact with the *form rollers* that contact the plate. The advantage that continuous-flow systems have over the conventional *intermittent-flow dampening system* is that periodic surges of *fountain solution* are eliminated, and the whole system itself is more instantaneously responsive to adjustments in the amount of fountain solution flowing from the fountain. There are several varieties of continuous-flow systems: *inker-feed systems*, *plate-feed systems*, and combinations of both. (See *Dampening System*.)



One configuration of continuous-flow dampening system.

Continuous Forms

Any blank or printed forms produced as a long sheet, separated by perforations, as opposed to forms cut into separate sheets.

Continuous Forms Stacker

An output or delivery unit that refolds and stacks a set of *continuous forms* after printing.

Continuous Leading

In typesetting, the continuous feeding of photographic material in a phototypesetter.

Continuous Process

In any manufacturing process, the ongoing production of a steady stream of material, in contrast to a *batch process*.

Perfect Binding

Perfecting Press

the pages together, while a layer of a high-viscosity hot-melt adhesive is used to adhere the book block to the cover. Thicker publications, such as metropolitan telephone books or heavy catalogs, use three different types of adhesives.

Most of the adhesives used in perfect binding are hot-melt adhesives, a mixture of *resins* and *polymers* which become fluid at high temperatures and dry by cooling back to a solid state. Most hot-melts achieve their best combination of flow characteristics and bonding strength when applied at a temperature between 350–400°F. In addition to hot-melts, *polyvinyl acetate*-based adhesives are often used. These do not need to be heated in order to be applied, but require special ovens to dry. They do, however, provide a more flexible spine than do traditional hot-melt adhesives. A third type of adhesive increasing in popularity is a polyurethane reactivate (PUR) adhesive. PUR-bound materials tend to lie flatter than material bound using other adhesives, PUR bindings tend to dry faster, and tend to be more durable. PUR, however, is more expensive and emits toxic vapors when heated.

Cover Feeder. After applying the adhesive, the cover is applied to the book block. A feeding mechanism scores the cover where it is to be folded around the book block, and the cover is pressed onto the backbone. *Nippers* pinch the cover around the spine, while clamps press the front, back, and sides securely around the block. The bound book is then dropped onto a conveyor belt where it is sent for trimming.

Trimmer. Once the adhesive is cool, the tops of the folded signatures of the book block need to be split, and trimming around the other sides may also be necessary. Often, *three-knife trimmers*—located in-line or off-line—can trim all three unbound sides at once. In some cases, binding is done *two-up*, where two books are bound together as one unit. In this case, the two individual books must be split apart prior to trimming. Some books can be trimmed *two-on*, or one book on top of another. This is more effective when used with thinner books.

Counter-stacker. The final step in the perfect binding process is the *counter-stacker*, a device which counts the number of individual units coming off the finishing line and stacks them for shipping.

Perfect binding equipment can bind up to 18,000 units an hour, with trimming stages slowing the process down somewhat; three-knife trimmers operate only up to about 6,000 units per hour. Any overflow can be diverted directly to stackers and trimmed off-line.

Despite the name of the process, perfect binding is not truly "perfect." Inflexible adhesives can result in books not lying flat, and the spines of paperback books can often be distorted almost beyond recognition, primarily by sloppy readers. The Swedish textbook manufacturer Otava has invented the "Otabind process" of perfect binding which uses two applications of a quick-drying adhesive along the

spine. The binding is reinforced with additional layers of hot-melt adhesive along both sides of the book block, which are topped with crepe paper or cloth, followed by another layer of adhesive to secure the cover. The cover, in turn, has been scored several times, which in effect creates "hinges" which make the spine very flexible.

Perfect bind is also used occasionally in conjunction with case binding, where an adhesive is applied to the spine of a book block after sewing. Many book publishers use the same book blocks for hardcovers and their corresponding trade paperbacks. If there is a significant number of hardcover books left in the warehouse, the trade paperback is produced by stripping off the cloth case and perfect binding a paperback cover onto the book blocks, rather than printing a whole new edition. This is an economical way of producing paperback versions of hardcovers which have not sold as well as had been anticipated, the only drawback being is that corrections or updates to the text cannot be made.

(See *Binding and Finishing*.)

Perfect Casebinding

In *binding and finishing*, a combination of two separate types of binding—*perfect binding* and *case binding*—in which *signatures* are bound together with adhesive prior to attaching the case. Perfect casebinding is performed to eliminate the *thread sewing* characteristic of traditional case binding.

Perfecting

The printing of the reverse side of an already-printed sheet, especially when it is performed on a *perfecting press*, utilizing either special *transfer cylinders* or printing units to print on two sides during one pass through the press. See *Perfecting Press*. Printing on the reverse side of a printed sheet by means of successive passes through a press is commonly referred to as *backing up*.

Perfecting Press

A printing press, especially one used in *offset lithography*, that allows printing on both sides of a sheet of paper in one pass through the press. There are two basic configurations of offset perfecting presses. In a *convertible perfecter*, special *transfer cylinders* between successive printing units flip the paper over after it leaves the first *impression cylinder*, allowing the second unit to print on the reverse side of the sheet. Such presses have the advantage of being able to be used for single-side multicolor printing, simply by adjusting the transfer cylinders to keep them from flipping the sheet over. A second type of perfecting press, used primarily in *web offset lithography*, is called a *blanket-to-blanket press*, and utilizes one printing unit in which the impression cylinder is replaced by a second *blanket cylinder* directly below the first. As the sheet or paper web passes between the two blankets, images are printed on both sides at the same time. (See also *Offset Lithography*.)

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THE GATF GLOSSARY OF GRAPHIC ARTS TERMS

GATF

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Library of Congress Catalog Card Number: 94-76582
International Standard Book Number: 0-88362-172-X

Printed in the United States of America

Second Edition
Order No. 1305

A catalog of GATF text and reference books, Learning Modules, audiovisuals, and videotapes may be obtained on request from the Graphic Arts Technical Foundation at the address given at the bottom of the title page.

The first edition of this project was funded, in part, by a grant
from the
Graphic Arts Education and Research Foundation.

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00150-051304

Glossary of Graphic Arts Terms

The rendition of tones on a positive are similar to those on the original. 4, 65

contact printing. Producing a photographic print by exposing sensitized paper, film, or printing plates held against a negative or positive in a vacuum frame. The resulting contact print is a same-size negative or positive reproduction. 4, 65



contact printing frame. A device used in contact printing to hold a negative against photographic paper or film with vacuum pressure. Light from an external source exposes the paper or film. 4, 65

contact screen. A photographic film with a dot structure of varying density that is placed in contact with unexposed film to convert a continuous-tone image into patterns of small, solid-tone dots that vary in size (a halftone). See also: *halftone screen*. 4, 65

contaminant. Any physical, chemical, biological, or radiological substance or matter that has an adverse effect on air, water, or soil. 77

continuous discharge. A routine release into the environment that occurs without interruption, except for infrequent shutdowns for maintenance, process changes, etc. 77

continuous feeder. A paper-supply mechanism that can be reloaded without stopping the press. 60

continuous form. A series of connected sheets that feed sequentially through a printing device. 25

continuous improvement. Process of business management based on data tied to customer satisfaction. See also: *total quality management*. 74

continuous jet. A nonimpact printing technology in which a steady stream of ink is forced at high pressure through a small nozzle and dispersed as small droplets through a charging field. The stream of charged droplets then passes between high-voltage deflection plates. Because the plate voltage varies, only selectively charged droplets form the desired

shape or pattern on the substrate. Excess droplets are diverted and recirculated. 25

continuous pulping. Using uninterrupted pressure from a continuous digester to extract water from wood during the papermaking process. Alternative term: *batch digester*. 72

continuous tone. A photographic image or art (such as a wash drawing) that has not been screened. It has infinite tone gradations between the lightest highlights and the deepest shadows. 63

continuous-tone gray scale. A scale of uniform tones, from white to black or transparent to opaque, without a visible texture or dot formation. 30

continuous-tone negative. An inverse impression of tones from the original reproduced on sensitized film without using a halftone contact screen. 30

continuous-tone proof. An illustration without halftone dots, which is produced on a computer screen at view file or fine file resolutions with the red, green, blue (RGB) color parameters. 3

contour. A typographic form in which type is set to create "shapes" other than blocks. Line lengths are individually calculated to ensure that the type fills a prescribed image or nonimage area. 35

contouring. A printed image defect in which shade and density variations are in evidence as visible steps. 40

contrast. The relationship or degree of tonal gradation between the lightest and darkest (highlight and shadow) areas in an original, reproduction, or negative. 30

contrast grade. A rating of 0–5 that designates the tonal differences among various photographic papers. A paper with a grade of 0 has the lowest contrast, and one with a grade of 5 the highest. Grade 0 paper is used with high-contrast negatives, and grade 5 paper is used with low-contrast negatives. 24

Glossary of Graphic Arts Terms

ink drum. A metal roller in the ink distribution system of a press that moves back and forth sideways to help mix the ink and reduce ghosting. Alternative terms: *oscillator*; *vibrator*. 48

ink dry back. An optical loss of density and color strength that may occur while an ink is setting. To achieve the proper dry density, the ink is printed with a wet density slightly higher than the projected dry density. 37, 71

ink feed. The amount of ink delivered to the ink form rollers. 37, 71

ink film graininess. A rough or sandpaper-like appearance in what should be a smooth, continuous ink film on the press sheet. 37, 71

ink film thickness. The depth of a wet ink film in the ink train or on the ink form rollers. 37

ink form roller. See *form roller*. 60

ink form roller setting. The correct pressure adjustment of an ink form roller against the oscillator and the plate. 37

ink fountain. The trough on a printing press that holds the ink supply to be transferred to the inking system. The operator controls ink volume from adjustment screws or keys on the fountain or from a remote console. 48

ink setting. (1) The increase in viscosity or body (resistance to flow) that occurs immediately after the ink is printed. (2) An adjustment the press operator makes to the inking system to control ink volume. 71

ink strength. The coloring power of an ink. 71

ink tack. The sticky or adhesive quality of an ink. See also: *tack*. 37, 71

ink transfer. The amount of ink supplied to a substrate, expressed as a percentage of the total ink available. 71

ink transparency. The degree to which light passes through an ink film without being absorbed or appreciably scattered. 37, 71

Ink trapping. See *trapping*. 71

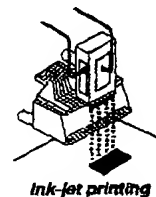
ink vehicle. A complex liquid mixture in which pigment particles are dispersed. 60

ink-dot scum. On aluminum plates, oxidation characterized by scattered pits that print sharp, dense dots, or ink material trapped in the grain. 71

inker-feed dampening system. An integrated, continuous-flow dampening system that delivers the dampening solution to the first ink form roller. 60

inking system. The section of a lithographic press that controls the distribution of ink to the plate. Alternative term: *inking mechanism*. 38

ink-jet printing. A nonimpact printing process in which a stream of electrostatically charged microscopic ink droplets are projected onto a substrate at a high velocity from a pressurized system. The electrically controlled flow of droplets is either intermittent or continuous. 40



Inkometer. An instrument that measures the tack and length of printing inks in numerical terms. 60, 63

ink/water balance. In lithography, the appropriate amounts of ink and water required to ink the image areas of the plate and keep the nonimage areas clean. 36, 60, 63

in-line converting. Converting done directly from the last printing station or drying unit into the converting machinery in one continuous operation. 20

in-line finishing. Manufacturing operations such as numbering, addressing, sorting, folding, diecutting, and converting that are performed as part of a continuous operation right after the printing section on a press or on a single piece of equipment as part of the binding process. 20

input. (1) To enter data or program instructions into a computer system. (2) The data or instructions themselves. 40

Glossary of Graphic Arts Terms

Pareto principle. First defined in 1950, it suggests that 80% of most problems come from 20% of the possible causes. 74

parity bit. An additional data bit that is used to check the correctness of the associated group of data bits. The parity bit is included, or omitted, from the data bits to produce the necessary odd or even total number of bits. Alternative term: *parity check*. 48

paste drier. A highly viscous drier prepared by grinding the inorganic salts of manganese or other metals in linseed oil varnishes. 36

pastel drawing. An illustration made with chalk, clay, charcoal, and/or pigments in a wax base. 30

pastels. Soft or light colors usually in the highlight to midtone range. 8

paster. (1) A device used to apply a fine line of paste on either or both sides of the web to produce finished booklets directly from the folder without saddle stitching. The paste is applied from a stationary nozzle as the web passes underneath it. (2) An eight-, twelve-, or sixteen-page booklet that is pasted instead of saddle-stitched together. (3) An automatic web splicer on a press. (4) The rejected web with a splice in it. 48, 68

pasteup. The camera-ready assembly of type and line art (drawings), e.g., line copy prepared manually or electronically for photographic reproduction. Alternative terms: *mechanical*; *photomechanical*. 36

patent base. Sectional metal blocks used as supports to hold letterpress printing plates in position on the press or to hold metal type in position on the chase. Alternative term: *patent block*. 20

patrices. Metal dies of raised characters used to produce the character molds, which are then used to make metal type. 20

peaking. Electronic edge enhancement produced by exaggerating the density differences at tonal boundaries to create the visual effect of increased image sharpness. See also: *unsharp masking*. 10

pebbling. Embossing paper after it has been printed to give it a rippled effect. 48

peel, automatic. A spring or cam device on larger automatic screen-printing presses that lifts the screen behind the moving squeegee. 26

PEL. Another term for picture element. (1) In computer graphics, the smallest element of a display surface that can be independently assigned color and intensity. (2) The area of finest detail that can be reproduced effectively on a recording medium. See also: *pixel*. (3) See *permissible exposure limit*. 25

pen plotter. A printing device using liquid ink dispensed from individual color cartridges, usually to form line and text images. 40

percent grayness. Densitometric relative measure of achromatic density in a color as compared to the major filter density. See also: *grayness*. 6

perf. See *perforating*.

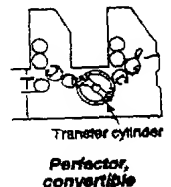
perf strip. A band that is bound into saddle-stitched publications so that single-leaf inserts can be tipped in. If perf strips were not used, publications could only accept four-page inserts. Alternative term: *hangers*. 64

perfect binding. The use of glue to hold the pages of a book or magazine together. Alternative term: *adhesive binding*. 48

perfecting. Printing both sides of a sheet in the same pass through the press. 65 ✓

perfecting press. A printing press that prints both sides of a sheet in a single pass through the press. Alternative term: *perfector*. 48 ✓

perfector, convertible. A sheetfed press with a special transfer cylinder in the gripper system that allows the sheet to tumble end for end between printing units so that the other side of the sheet is printed by the second unit. On a two-unit convertible perfecter, two colors can be printed on one side of the sheet, or one color



Glossary of Graphic Arts Terms

can be printed on each side in a single pass through the press. **60**

perforating. Punching a row of small holes or incisions into or through a sheet of paper to permit part of it to be detached; to guide in folding; to allow air to escape from signatures; or to prevent wrinkling when folding heavy papers. A perforation may be indicated by a series of printed lines, or it may be *blind*; in other words, scored and creased without a printed indication on the outline. Alternative term: *perf.* **68**

peripheral equipment. The various input and output devices, storage units, and other hardware that form a computerized system, other than the computer itself. Any auxiliary equipment. **40**

permanence. The ability of a paper to resist change in one or more of its properties during storage and with aging. **72**

permissible exposure limit (PEL). A regulation established by OSHA that states the maximum amount of time employees can be exposed to airborne contaminants. **26**

pH. The degree of acidity or alkalinity of a substance or solution measured on a scale of 0 to 14, with 7 as the neutral point. Numerous instruments are available for measuring pH value. **72**

Photo CD™. A format developed by Kodak for storing compressed still photographic images on CD-ROM disks. The digital photographs can be viewed on home players or can be retrieved with computer-based systems. See also: *CD-ROM.* **84**

photocell. A device that converts the energy in a light ray into electrical energy. **8**

photocombining. See *composite*; *gang*; *montage.* **65**

photocomposing machine. See *multi-imaging camera*; *step-and-repeat.* **65**

photocomposition. See *phototypesetting.* **27**

photoconductive. A material that carries electricity in the light and serves as an electrical insulator in the dark. **40**

photoconductor. (1) A medium for transferring images to paper. (2) An insulator that conducts electricity when it is illuminated with electromagnetic radiation with wavelengths shorter than a critical value. **25**

photocopy. A reproduction of an original formed by fused toner particles in a nonimpact process such as xerography. **48**

photodiode. A small solid-state device capable of detecting the presence or absence of light. It is the principal component of light detection and measuring instruments. **48**

photoelectric. Process of converting light energy into electrical energy. **36**

photoelectric cell. Any light-detecting or measuring element that produces an electrical signal relative to the light stimulus striking the element. Alternative term: *photocell.* **36**

photoengraving. The process of making printing plates by exposing line and halftone negatives onto a sensitized metal, converting the image into an acid resist, and etching the image areas in relief as required for letterpress printing. **20**

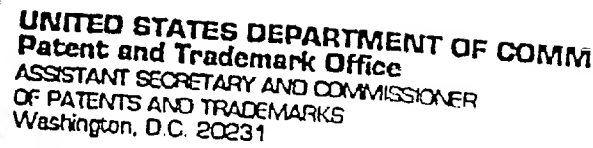
photographic proofs. Blue, brown, or silver prints made from negatives or positives and used to check layout and imposition before plates are produced. **36**

photography. The use of actinic light to produce a latent or permanent image on sensitized materials. **48**

photography, digital. See *camera, digital.*

photogravure. Using photographic methods in the production of plates or cylinders for gravure, or intaglio, printing. **66**

photoimposition. Exposing a single image in a succession of specific positions on a plate or film, either by manually moving the pin-registered image or by

[illegible]

7/5/00

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Wednesday, July 05, 2000

SERIAL NO.: 09/315,796 - Reissue
INVENTOR(S) : Davis, Bill L. et al.
FILING DATE: 5/20/99
ATTORNEY'S DOCKET # WILL-2501

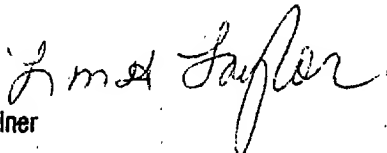
**TITLE OF INVENTION: COMBINED LITHOGRAPHIC/FLEXOGRAPHIC PRINTING
APPARATUS AND PROCESS**

Per our conversation on July 5, 2000 12:30 EST - Your request for an additional day, due to the incorrect date on the mailing envelope is approved

Spoke with Robert Falk. Faxing this note to 972-716-9532

Respectfully Submitted.

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